MATTEN

Dr. Wendy Tu:
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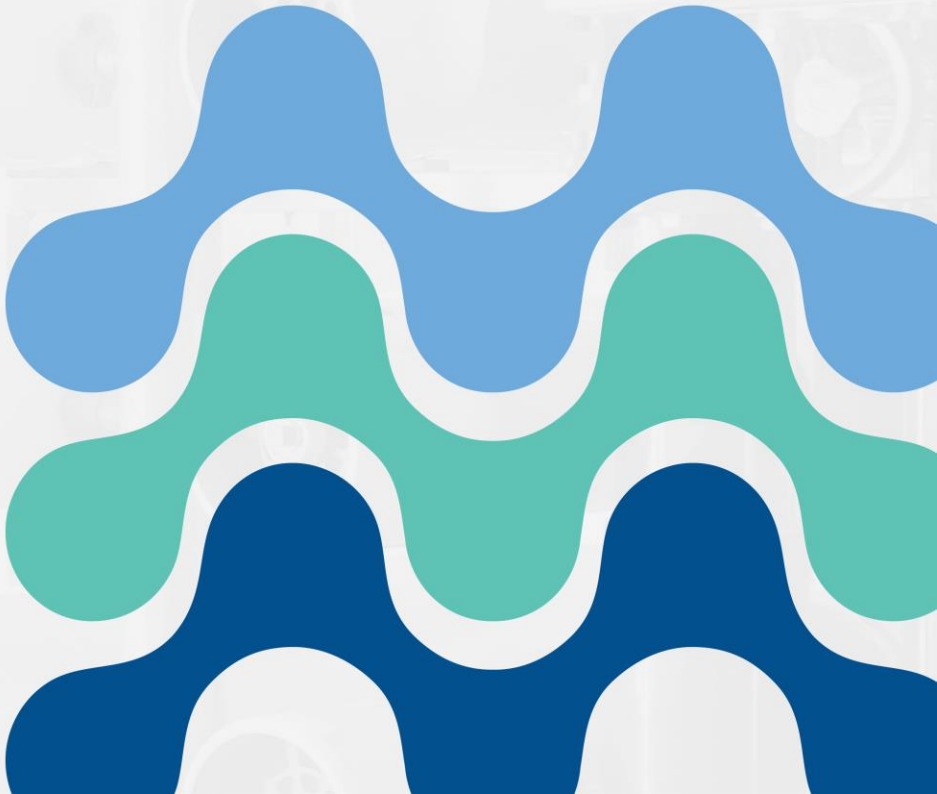
Contact: +(65) – 6759 2977

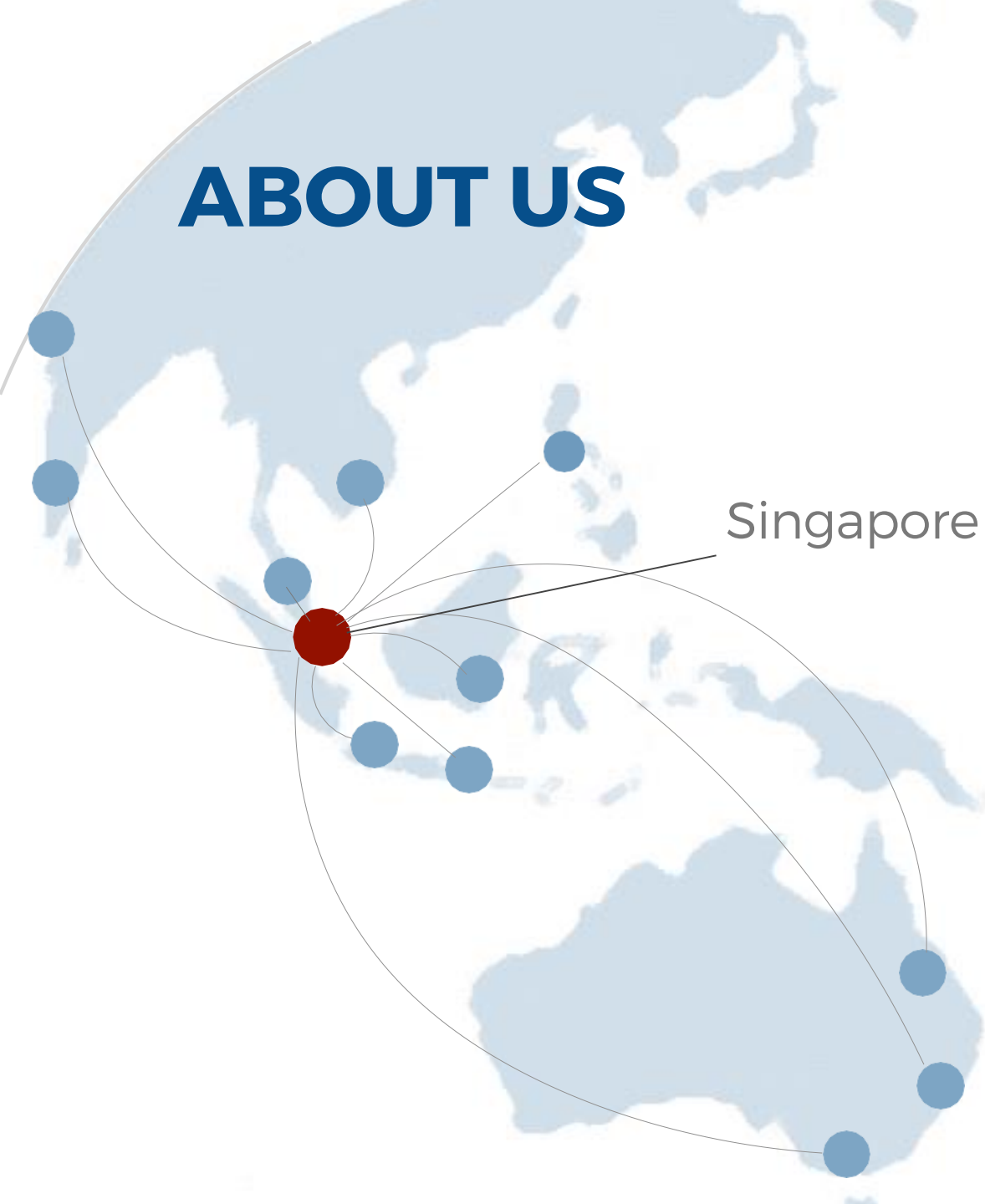
Sustainable Water Solutions

Highly efficient membrane technologies enabled wastewater minimization and reuse.



1. About MATTEN
2. Case study – Greywater recycling
3. Case study – Cooling tower blowdown recovery and reuse
4. Case study - RO reject recovery for direct bottling

ABOUT US



Since 1994.

more than 2 decades of innovation,expertise and experiences in water and wastewater treatment technologies and systems.

A company of German SKion Water.

A multiple-award winning water firm.

Headquarters & regional presence.

In-house capabilities and facilities.

Global Coverage

- The first and only investment of SKion Water in Asia.
- We have access to our European and North American partners' diverse, advanced and innovative technologies for applications in Asian and Australian markets.

GLOBAL WATER AWARDS SKion WATER

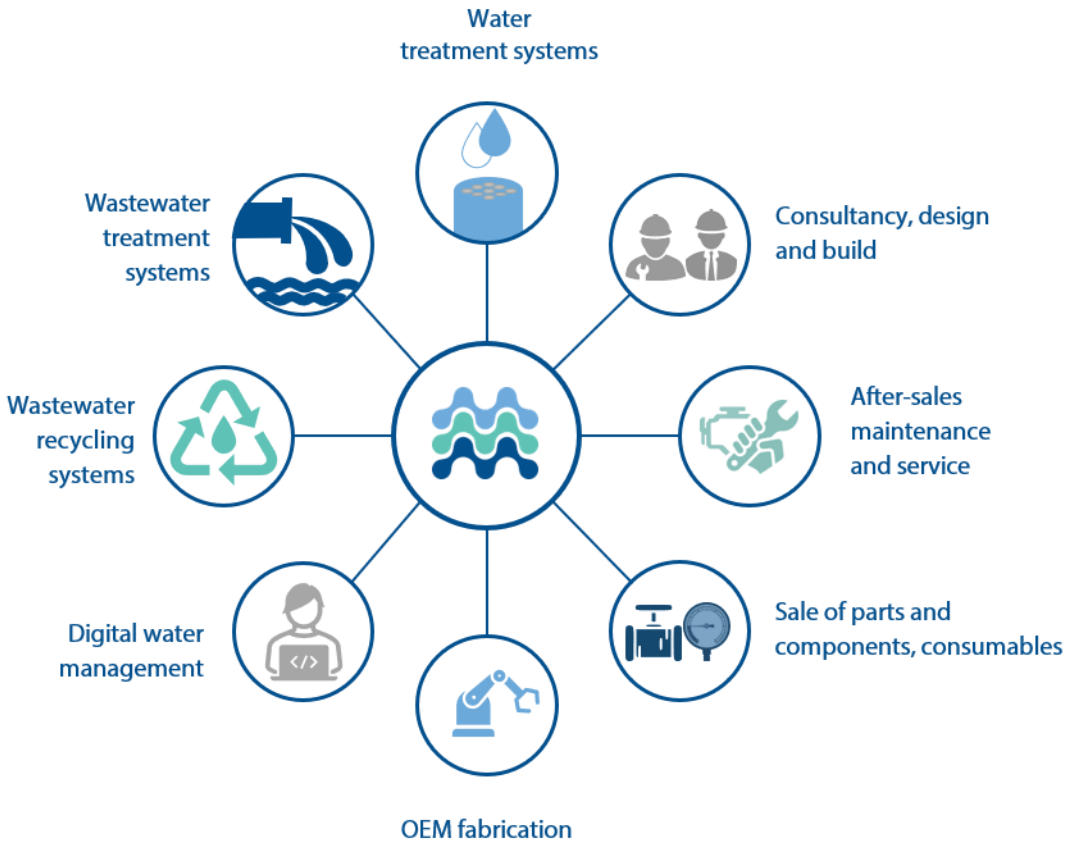
Your Trusted One-stop Solution Provider

Mission

Design, Develop and Build the most efficient water treatment processes to help our customers solve their water challenges, by deploying advanced technologies with our experiences and expertise.

Vision

To become "an Extraordinary" Water Company" to our customers and society and help build a more sustainable environment for our future generations.



Our Core Competencies

Standard and modular Systems

All-in plug-and-play simplicity for easy in-situ installation.

Modular skids for larger capacity.

Easy to be shipped, transported and installed for large plants.

Containerised systems.

Fitting all into a box. By thinking out of the box.

Designed-and-built.

More than meeting clients' and sites' specific requirements.

Industrial: Hospitality

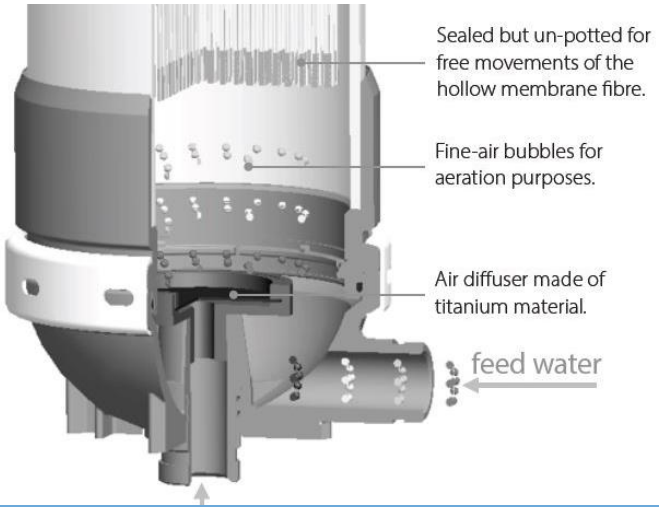
Greywater recycling system for cooling tower usage

About the system	
System capacity	150 m3/day
System recovery	85%

Process flow:

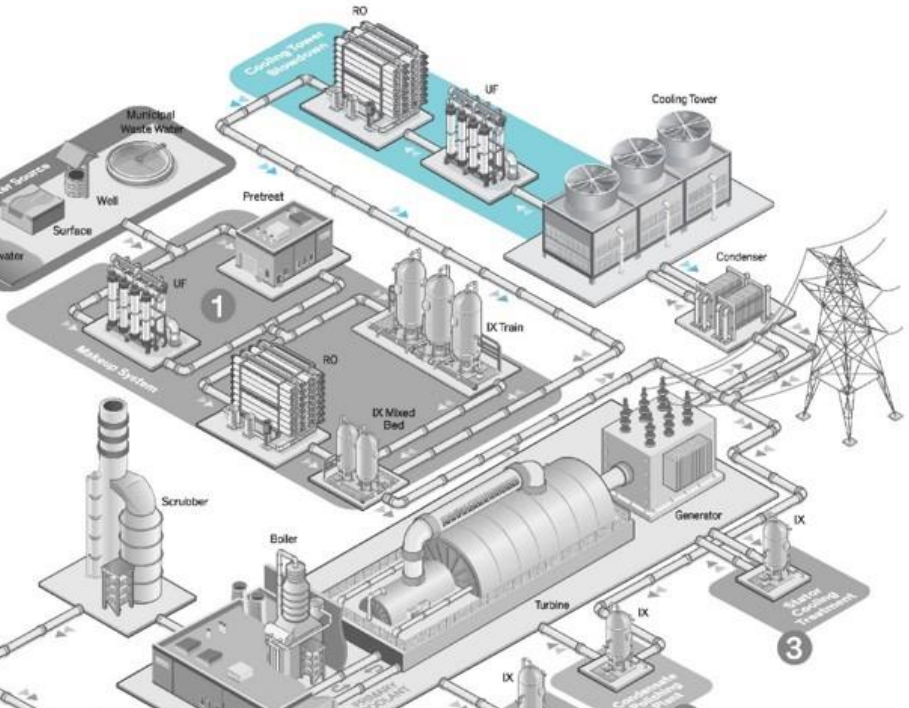
Greywater collection tank -> disinfection -> Proprietary UF -> Cooling Water Tank

Savings: 52,000 m3/year,



Cooling tower blowdown recovery and reuse

Feed water (CTBD)		Recycled water
> 1,000 µS/cm conductivity.	S$ 0.40/m3 total OPEX.	< 150 µS/cm conductivity.
6.5 - 8.5 pH	S$ 0.133/m3 unit electricity cost.	7.0 - 8.5 pH
5 - 10 NTU turbidity.	S$ 0.047/m3 unit chemical cost.	< 0.2 NTU turbidity.
	S$ 0.22/m3 unit maintenance & replacement costs.	< 100 ppm TDS.



System	Capacity
Ultrafiltration Pre-treatment	10 m^3/hr
Low energy low fouling BWRO	7.3 m^3/hr

Process flow:

Blowdown collection tank -> UF -> RO -> disinfection -> Cooling Water Tank (NEWater)

Savings: 60,000 m3/year,

RO reject recovery for direct bottling

Key Technical Considerations

Stringent permeate fit for bottling production.

- Consistent permeate quality: < 20µS/cm.
- Flexible 2-pass or 3-stage interchangeable design allows water from different sources.
- Every bit food-grade. Every part sanitary.
- Fully automatic and highly efficient operation control with minimized water losses and energy savings.

Process Designs & Configuration

Producing more with less.

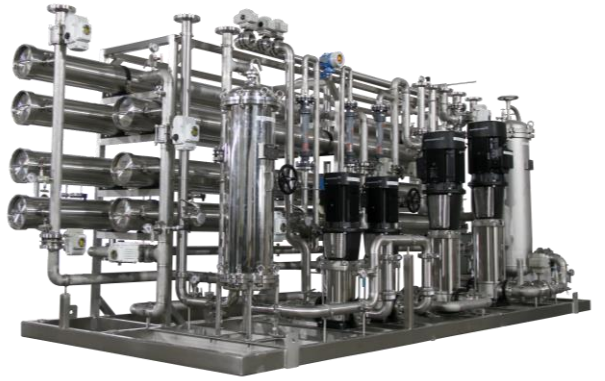
- Up to 80% recovery.
- Sanitary Full-fit RO membrane, sanitary designed RO vessel.
- Outstanding. Performance and look.
- All SS316L construct,
- In-situ hot water sanitizable with full auto built-inC IP and heater system

System	Capacity
2 pass mode (RO reject as Feed)	12 m^3/hr (40%)
3-stage mode (deepwell water as feed)	32 m^3/hr (75%)

Multiple barrier approach:

Cartridge filter (5µ abs) -> RO -> RO -> Polishing filter (1µs abs) -> Ozone

12 m3/hr => 24,000 bph @ 500mL



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THANK YOU

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A SKion Water Company | www.mattenplant.com

Alkaline Waste Recycling in Glove Manufacturing using Silicon Carbide (SiC) Ceramic

Mr. Chew Teik Ooi

(Business Development Manager)

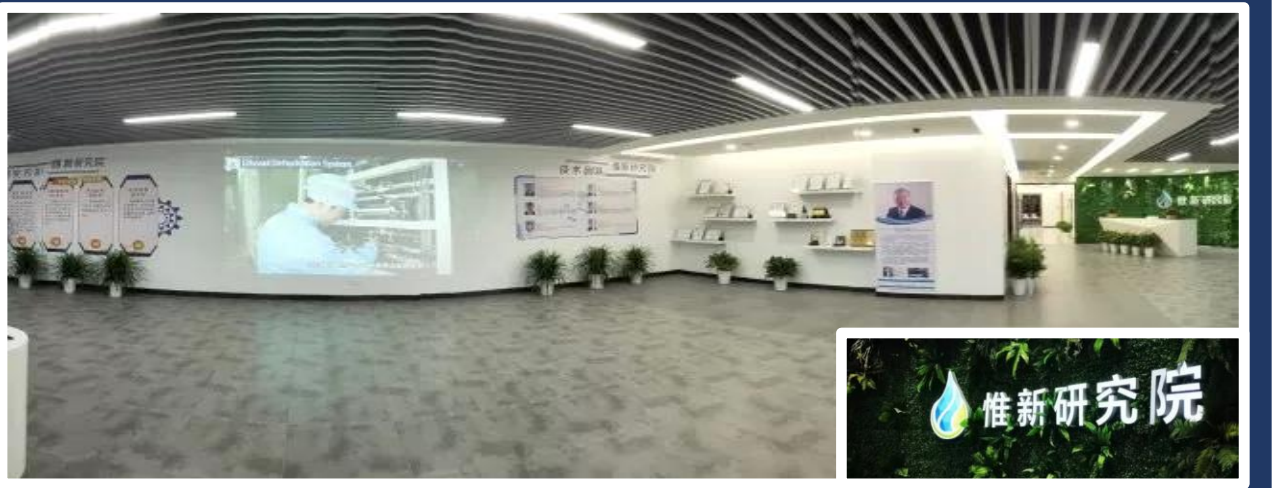
June 2021

Company Profile

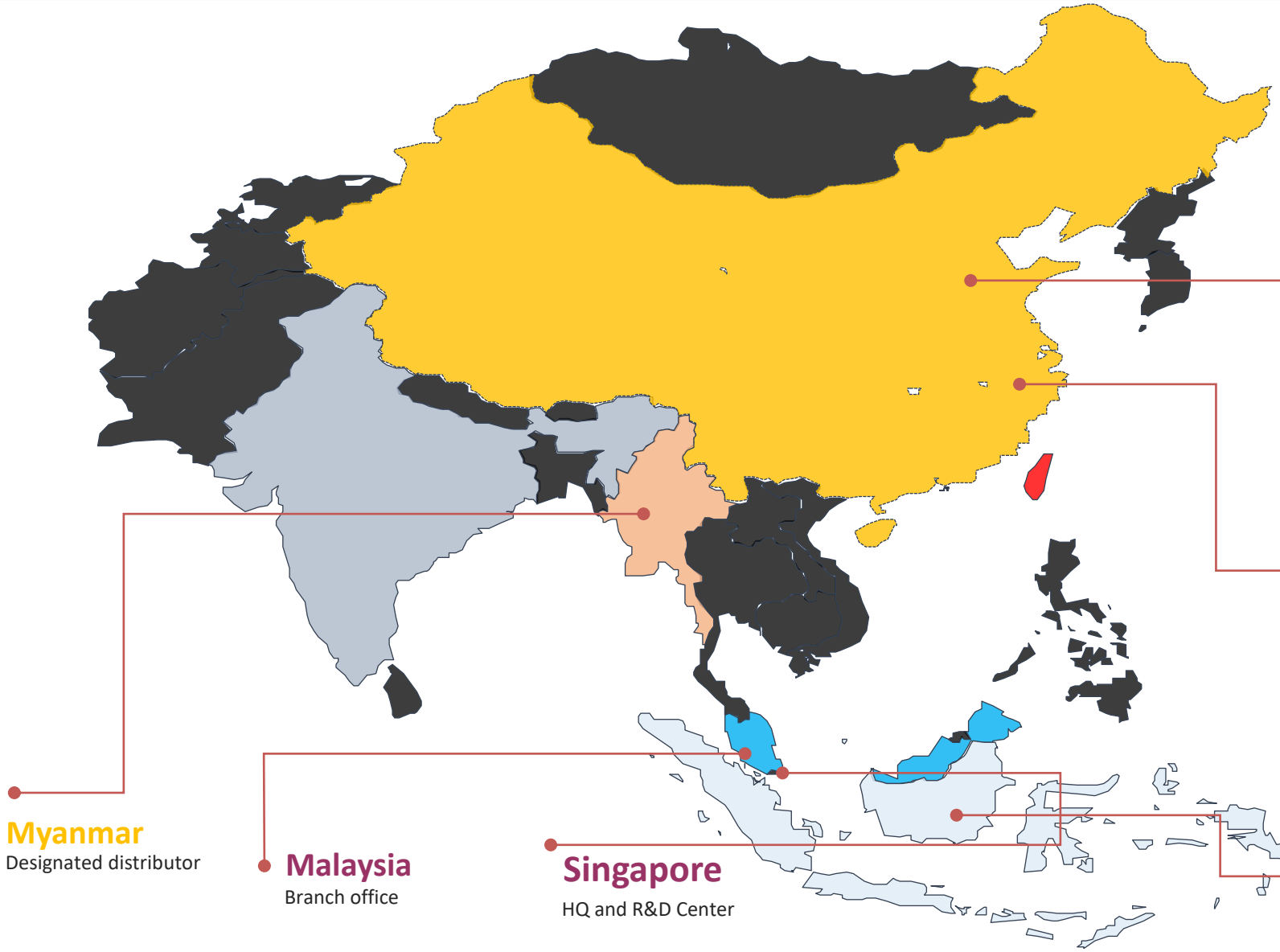
Century Water Systems & Technologies Pte Ltd is an innovative company specializing in water treatment, chemical separation and energy harvesting, especially for electronics, pharmaceutical and petrochemical sectors.

Our proprietary technologies include **PervaPure™** membranes, **NanoPure™** NF membranes, **HydroPure™** UF membranes, **Moisanite™** SiC Ceramic membranes, Reversal RO process, Electro-Fenton, etc.

We believe in Innovation, Dedication, Teamwork & Customer Satisfaction.



Regional Presence



Tianjin, China
Engineering & Project

Nanjing, China
China Technology Center

Myanmar
Designated distributor

Malaysia
Branch office

Singapore
HQ and R&D Center

Indonesia
Designated distributor

Technology Profile

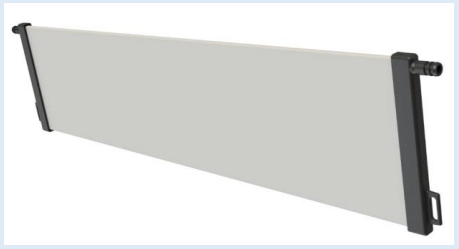
Key Technologies

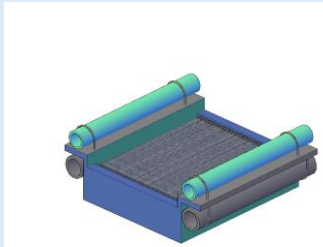
1) NanoPure™ LPNF01 Nanofiltration Membrane for Drinking Water Softening & Cleaning
2) PervaPure™ Pervaporation Membranes for Chemical Dehydration
3) HydroPure™ Fine Ultrafiltration Membranes for Niche Separation Applications
4) Moisanite™ SiC Ceramic Ultrafiltration Membranes for Water Applications

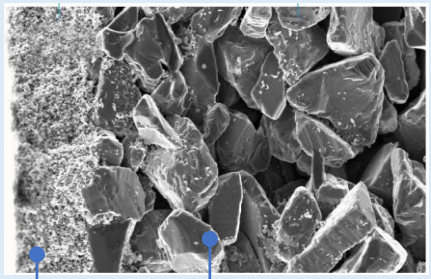
Ongoing Technologies in R&D

1) NanoPure™ LPNF02 Nanofiltration Membrane for Industrial Wastewater Applications
2) NanoPure™ Ceramic Nanofiltration Membrane for OSN and Water Applications
3) PervaPure™ Ceramic Membranes for Valuable Chemical Recovery
4) Multi-Stage Diffusion Dialysis (MSDD) for Wastewater Treatment and Power Generation

Moisanite™: Our Novel Flat Sheet SiC Membrane







Selective layer (Outer)

Pore size: 0.05 to 0.1 micrometer

Membrane body (substrate)

Pore size: 8 micrometer

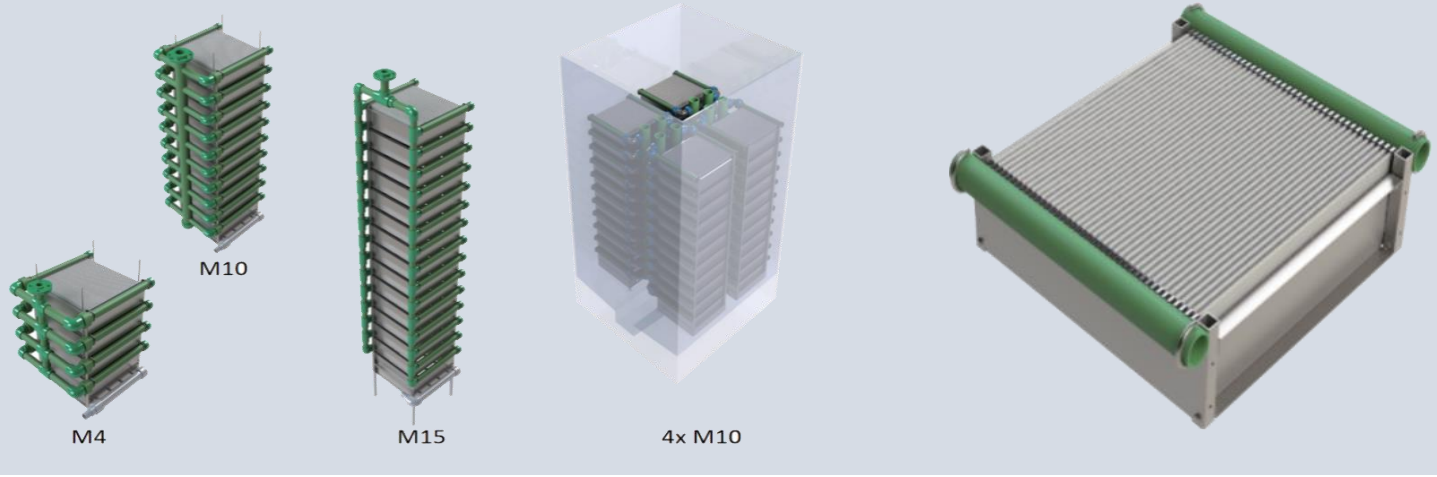
Feature	• Particle removal • Strong negative surface charge at pH 6-9 • Hydrophilic – water flux 5.0 LMH/bar
Retrofittable	• Simple process, easy integration into existing systems • Low pressure pump
Low cost	• High water efficiency • Low energy consumption
Long life-span >10 yrs	• Chemical resistance and high thermal stability • Anti-clogging (repel negative charge particles) • Enable high effective cleaning • Enable pH 1 to 14 constant exposure

Moisanite™ : Our Novel Flat Sheet SiC Membrane

Moisanite™ Series

WY-1

Silicon Carbide Ceramic Membrane



Moisanite™ Series

Silicon Carbide Ceramic Membrane

Moisanite™ series silicon carbide ceramic membranes are suitable for a variety of complex working conditions, completely replacing the mainstream organic membranes/alumina membranes in the market, increasing flux by 3-10 times, saving more than 2/3 of the area, and increasing service life by 3-5 times. Up to ten years.

It is suitable for all industrial and municipal water treatment and purification, including petrochemical, coal chemical wastewater treatment, reclaimed water reuse, acid and alkali particle removal and recovery, oil-field reinjection water treatment, municipal sewage treatment, purification water upgrading, etc.

Product Features and Advantages

Modular Design:
It is suitable for a variety of complex working conditions and can be superimposed.

Long Service Life:
Fully replace the mainstream organic film/alumina film on the market, and the service life is increased by 3-10 times, the highest 10 years.

Ultra high processing power:
Compared with ordinary ceramic membrane, the flux is increased by 3-10 times, and the area is saved by more than 2/3.

High chemical resistance:
The chemical stability is strong, and the wear rate is close to 0%.

Moisanite™ : Chemical Resistance SiC Membrane

Century Water

Test Environment * Concentration Reagent (wt %)	Temperature ˚C	˚F	Si/SiC composite (12% Si)	Tungsten Carbide (6% Co)	Aluminium Oxide (99%)	Silica Carbide (No free Si)
98% H_2SO_4	100	212	55.0	> 1000	65.0	1.8
50% NaOH	100	212	> 1000	5.0	75.0	2.8
53% HF	25	77	7.9	8.0	20.0	< 0.2
85% H_3PO_4	100	212	8.8	55.0	> 1000	< 0.2
70% HNO_3	100	212	0.5	> 1000	7.0	< 0.2
45% KOH	100	212	> 1000	3.0	60.0	< 0.2
25% HCl	70	158	0.9	85.0	72.0	< 0.2

*Remarks: *Test time: 125 to 300 hours immersion test.*
** >1000 mg/cm yr-not recommended.*
** 100 to 999 mg/cm² yr-It is not recommended to use for more than one month.*
** 50 to 100 mg/cm² yr-It is not recommended to use for more than one year.*
** 10 to 49 mg/cm² yr-According to the specific application, it is recommended to use 0.3 to 9.9 mg/cm²/year for a long time.*
** <0.2 mg/cm² yr-Can be used for a long time, no corrosion except the surface needs to be cleaned.*

Application: Typical Application and Water Flux

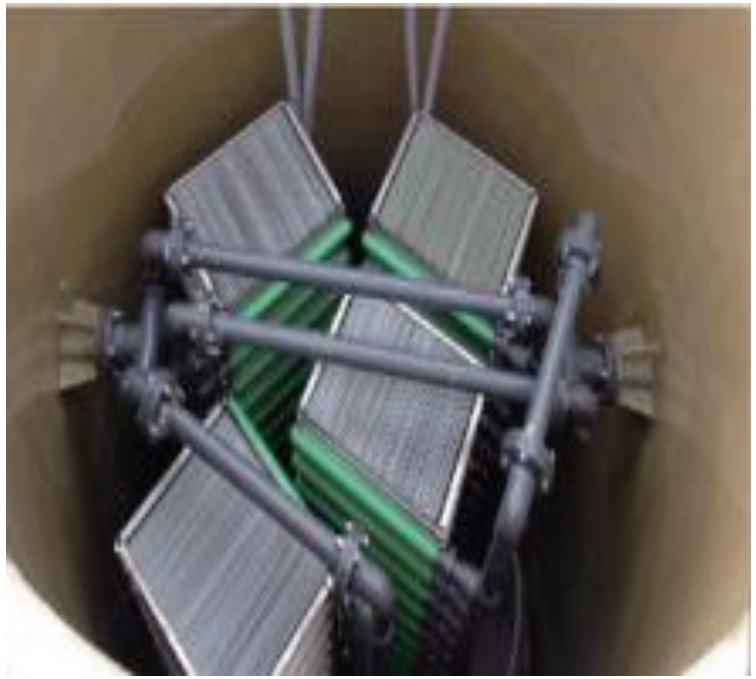
Application	Removal Type	LMH (L/m²h)
Ground Treatment	Fe, Mg, Ra, As, TSS	575~1200
Pre-Treatment of Seawater	Algae, TSS, Oil	200~500
Surface Water Treatment	Microorganism, TSS, Silt	200~600
MBR	TSS, bacteria, BOD, COD	45~80
MBBR	TSS, bacteria, BOD, COD	100~200
Treated Sewerage Effluent	TSS, bacteria, BOD, COD	100~200
Acid & Alkaline recycle	TSS, BOD, COD	80~200

- ✓Membrane is stable in extreme feed conditions where no other membrane survives:
  - ✓Solvents
  - ✓Ozone
  - ✓pH 1-14 constant exposure
  - ✓Oxidizing agents
- ✓Enables highly effective cleanings
- ✓Long membrane life

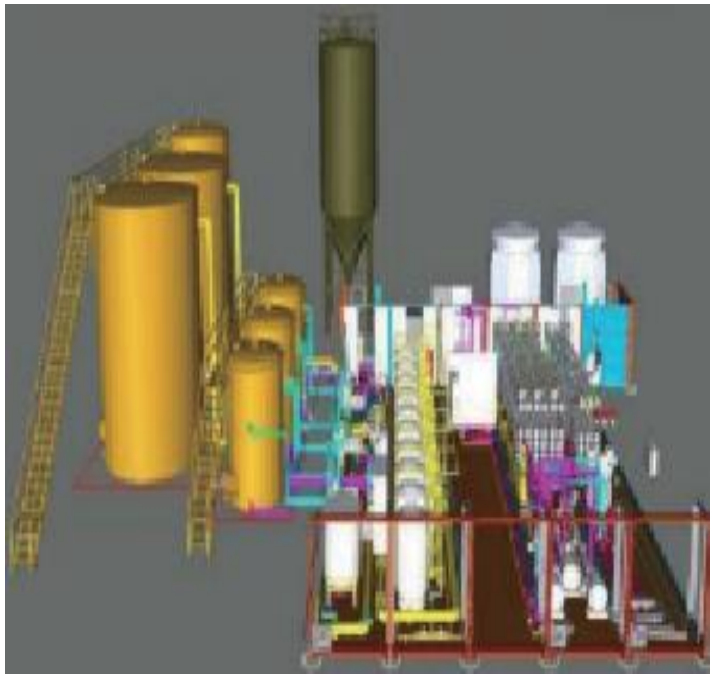
Remarks: (1) The throughput depends on the operation and maintenance of the entire system. (2) The indicators of product water quality may be slightly deviated based on the quality of influent water.
The data presented in the article are all tested and true and reliable, but the differences caused by different test methods and usage conditions are not excluded. Therefore, users should combine the actual application process and have a detailed understanding of Century Water.

Application Fields

Petrochemical and coal chemical wastewater treatment



Oil field reinjection water treatment

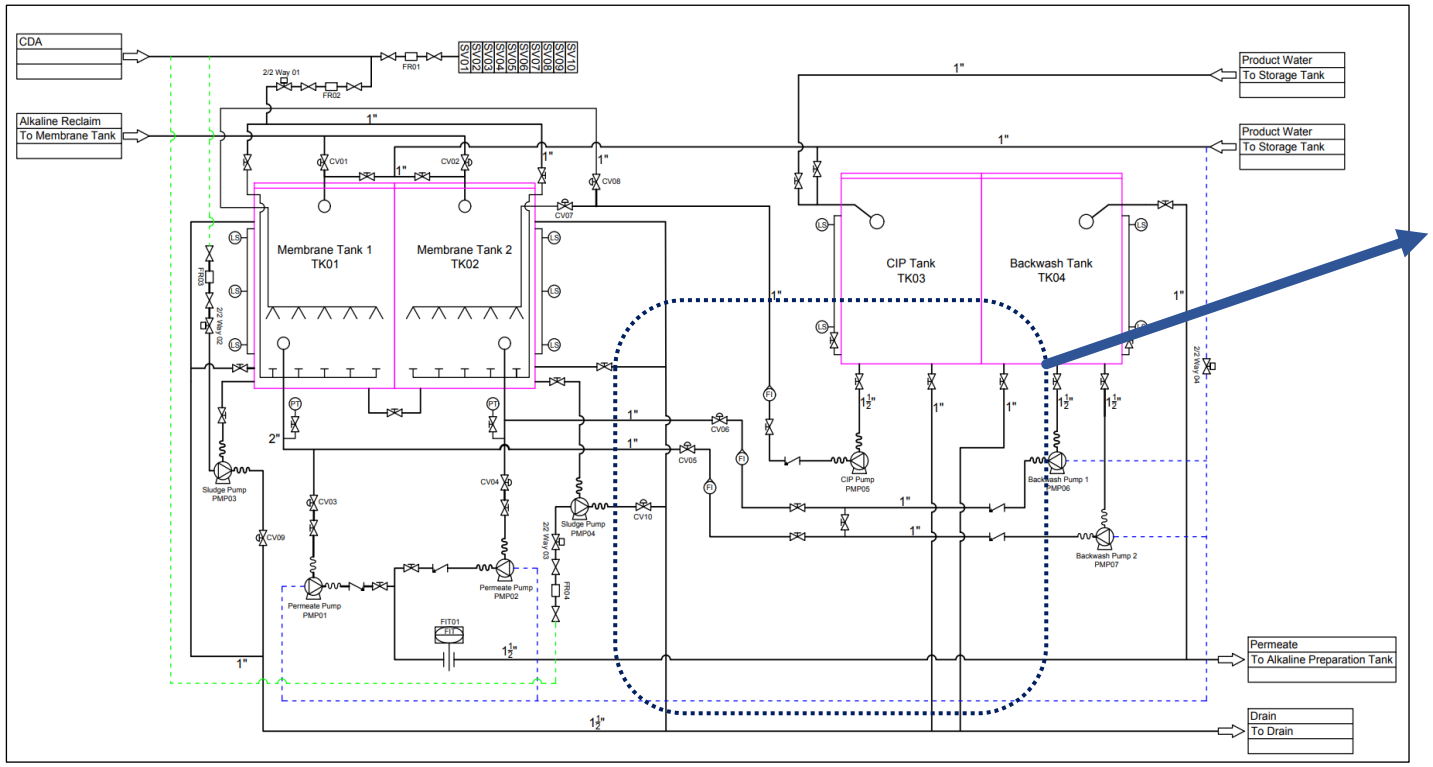


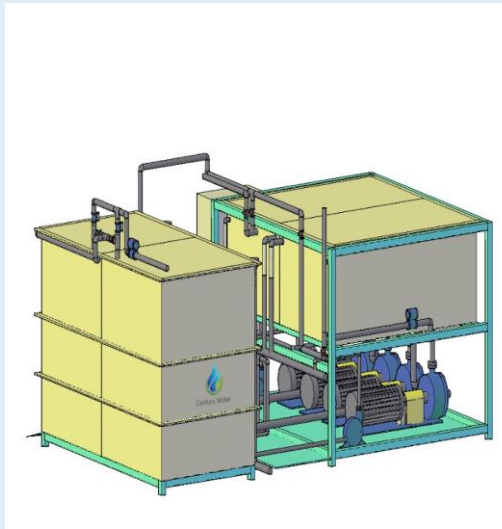
Acid and alkaline recycle system

Project in Malaysia

20 m^3/day or 1 m^3/hour

Alkaline waste recycle to production.
Alkaline chemical saving up to 80%





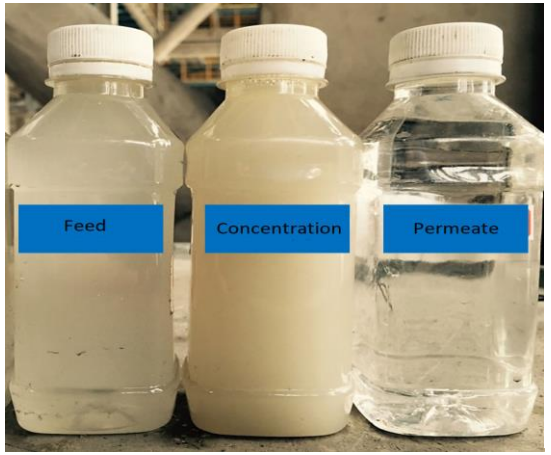
6 m^2 membrane module

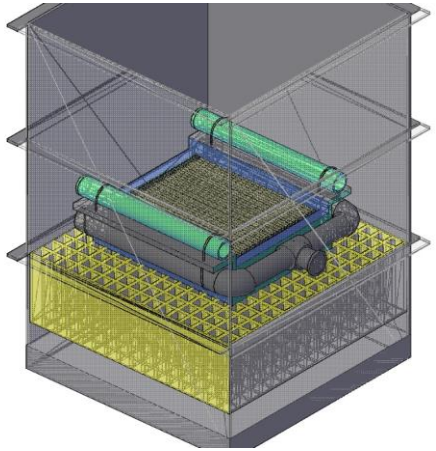
CASE STUDIES

Glove Manufacturing, Plant A

Customer	**Glove Manufacturing (Klang, Malaysia) – Plant A**
Project	Ceramic membrane is used to reclaim alkaline waste collected in alkaline tank. The alkaline waste liquids contains metal ions, surfactant, sodium hypochlorite and discharge to wastewater treatment plant. Century Water proposes to recover alkaline waste with recovery rate of 50 to 80% back to the alkaline preparation tank. The target is to save and reduce NaOH consumption for production.
Design	Flow: 0.5 m^3/hour (range : 0.5 ~ 3 m^3/hour) Alkaline waste concentration : NaOH ~5% Temperature : 60 degree °C TSS : 300 ~ 800 mg/L
Expected Results	Low energy consumption: 1.5 kWH Small footprint: 2.5 m^2 (ARS system) Utility rate: RM 2.80 per m^3 (USD 0.68) Payback period: less than one year Saving achieved: 50~ 80 % recovery rate Flux: 85 to 500 LMH Cleaning in progress: Regenerable

Parameter mg/L	pH	TSS	Concentration (NaOH)
Influent	13 ~ 14	300 ~ 800	3 ~ 5 %
Effluent requirement	13 ~ 14	< 100	3 ~ 5 %
Effluent quality	13 ~ 14	< 100	3 ~ 5 %

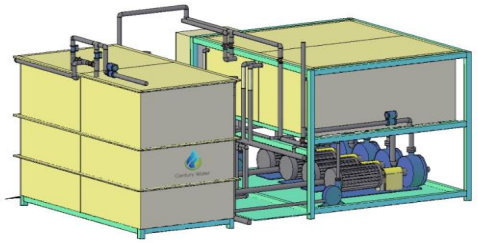


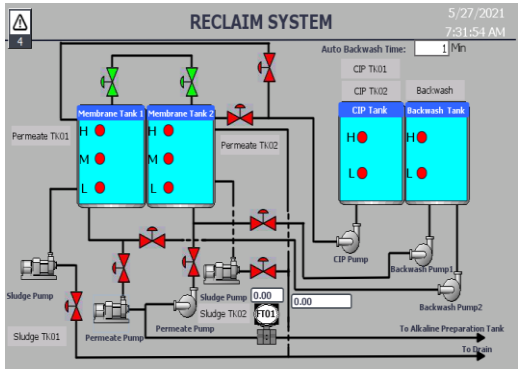


Glove Manufacturing, Plant B

Customer	**Glove Manufacturing (Kluang, Malaysia) – Plant B**
Project	Ceramic membrane is used to reclaim alkaline waste collected in alkaline tank. The alkaline waste liquids contains metal ions, surfactant, sodium hypochlorite and discharge to wastewater treatment plant. Century Water proposes to recover alkaline waste with recovery rate of 50 to 80% back to the alkaline preparation tank. The target is to save and reduce NaOH consumption for production.
Design	Flow: 1 m^3/hour (range : 1 m^3/hour ~ 6 m^3/hour) Alkaline waste concentration : NaOH ~5% Temperature : 60 degree °C TSS : 300 ~ 800 mg/L
Expected Results	Low energy consumption: 3 kWH Small footprint: 6 m^2 (ARS system) Utility rate: RM 2.80 per m^3 (USD 0.68) Payback period: less than one year Saving achieved: 50~ 80 % recovery rate Flux: 85 to 500 LMH Cleaning in progress: Regenerable

Parameter mg/L	pH	TSS	Concentration (NaOH)
Influent	13 ~ 14	300 ~ 800	3 ~ 5 %
Effluent requirement	13 ~ 14	< 100	3 ~ 5 %
Effluent quality	13 ~ 14	< 100	3 ~ 5 %

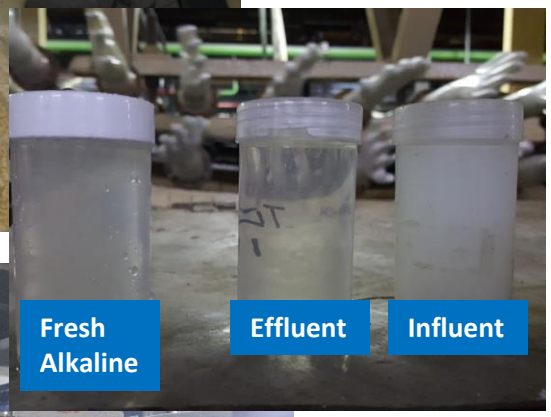




Glove Manufacturing, Plant C

Customer	**Glove Manufacturing (Kluang, Malaysia) – Plant C**
Project	Ceramic membrane is used to reclaim alkaline waste collected in alkaline tank. The alkaline waste liquids contains metal ions, surfactant, sodium hypochlorite and discharge to wastewater treatment plant. Century Water proposes to recover alkaline waste with recovery rate of 50 to 80% back to the alkaline preparation tank. The target is to save and reduce NaOH consumption for production.
Design	Flow: 0.5 m^3/hour (range : 0.5 ~ 3 m^3/hour) Alkaline waste concentration: NaOH ~5% Temperature: 60 degree °C TSS: 300 ~ 1,500 mg/L
Expected Results	Low energy consumption: 1.5 kWH Small footprint: 2.5 m^2 (ARS system) Utility rate: RM 2.80 per m^3 (USD 0.68) Payback period: less than one year Saving achieved: 50~ 80 % recovery rate Flux: 85 to 500 LMH Cleaning in progress: Regenerable

Parameter mg/L	pH	TSS	Concentration (NaOH)
Influent	13 ~ 14	300 ~ 1,500	3 ~ 5 %
Effluent requirement	13 ~ 14	< 100	3 ~ 5 %
Effluent quality	13 ~ 14	< 100	3 ~ 5 %



CENTURY WATER SYSTEMS AND TECHNOLOGIES PTE LTD

211 Woodlands Ave 9 #07-82/83 Woodlands Spectrum II Singapore 738960

Tel. +65 67555848
Email: service@century-water.com
Website: https://century-water.com/

SWA & IWA Webinar

Alkali Residue Wastewater Treatment Technology
+
Concentrated Brine Recycling Technology

SOUTECH TECHNOLOGY DEVELOPMENT GROUP

June 2021

Contents

- Wastewater Nature and its treatment bottleneck
- Treatment Process
- Engineering case

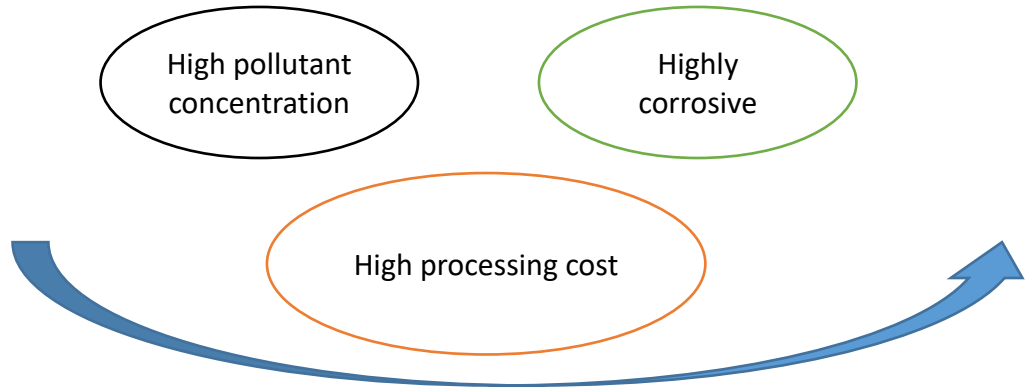
1.1 Alkali Residue

Alkali residue wastewater：

• Mainly comes from vacuum distillation unit and catalytic cracking unit.

•COD : 40000mg/L～400000mg/L,Sulfide :700 mg/L～20000 mg/L, Phenol : 200 mg/L～100000 mg/L, NaOH : 3%-5%

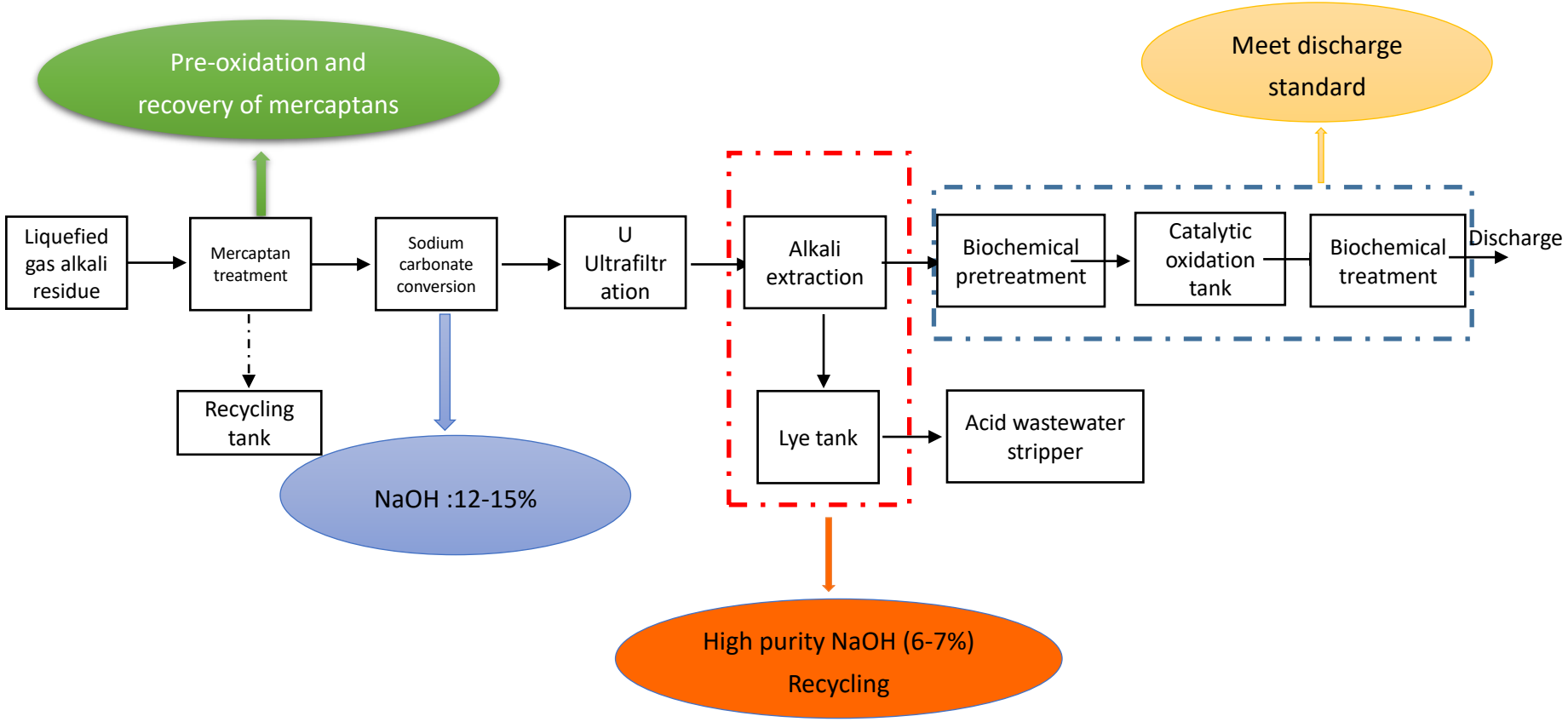
•“National Hazardous Waste List” : HW35.



“Misplaced resources"

Reduce processing costs

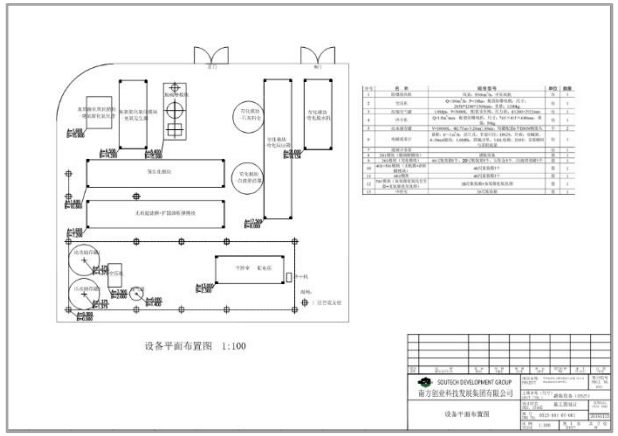
1.2 Treatment Process



1. Recycling and reuse of multiple “pollutants” in alkali residue wastewater.

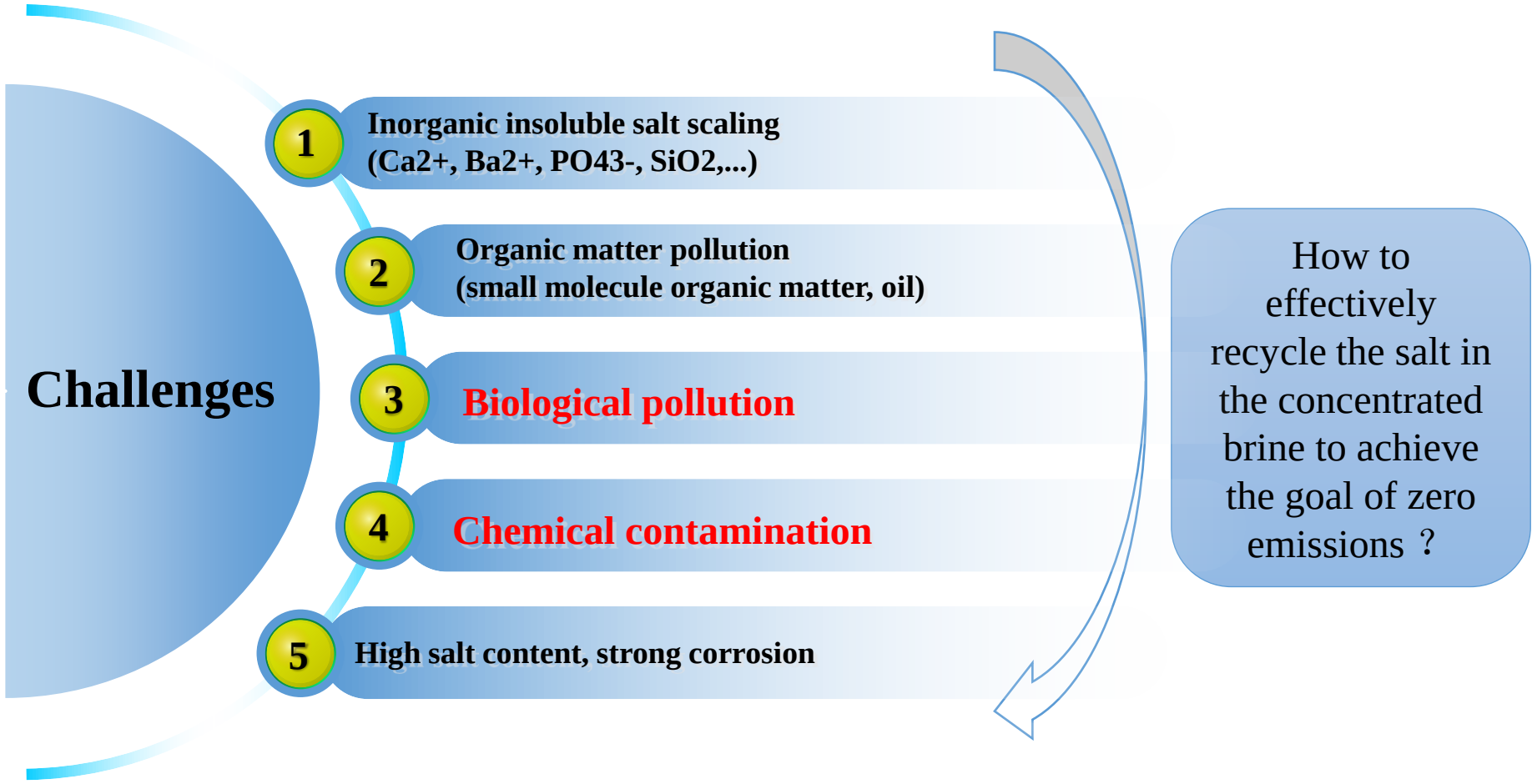
2. Effectively dispose of "pollutants" that cannot be reused temporarily, and meet emission standards.

1.3 Engineering case

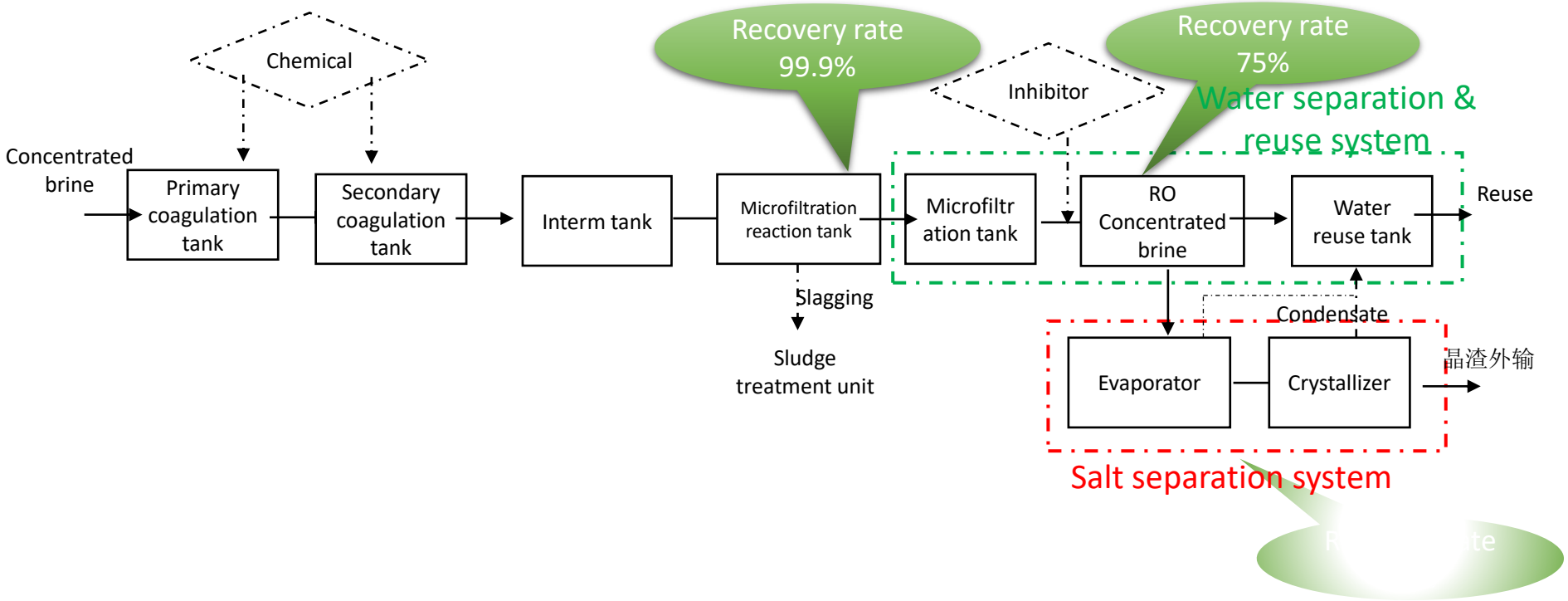


CPCC Waste Alkali Recycling Treatment Project in Hubei Province

2.1 Concentrated Brine



2.2 Treatment Process



Salt and water are effectively separated to achieve the goal of reuse respectively.

2.2 Treatment Process

1. Pre-concentration process reduces the amount of wastewater entering the evaporation and crystallization by 75%, which significantly reduces the investment of the entire system.

2. Simple process. Requirements for the influent are flexible, which is more suitable for high turbidity, high hardness and high alkalinity wastewater.

3. Quality excellent and stable. Thorough removal of heavy metal ions, insoluble salt substances, and soluble silicon.

4. High degree of process integration. It can be combined with a variety of processes, occupying a small area, and has a high degree of automation;

5. Energy saving. low water consumption (≤1%), low mud output (≤3%), and low operating energy consumption.

2.3 Engineering case

Microfiltration reaction tank

Reverse osmosis system

Raw water MF influent MF effluent

$NaSO_4$ 99%;
NaCl 98.5%

NaSO4 salt separated

Ningdong Coal Chemical Industry Park Brine Recycling Project

THANK YOU!

Sustainable Water Solutions:
Efficiency in Waste Water Treatment Technologies

online, 16.06.2021

Resource recovery from municipal wastewater and safe reuse in circular economy: EU innovative cases

Prof. Eng. Francesco Fatone, PhD, IWA Fellow

Università Politecnica delle Marche, Italy – WWEELab Group

Secretary IWA Resource Recovery Cluster

Coordinator H2020 «SMART-Plant»

WP/Task leader of H2020 Innovation actions

«HYDROUSA», «ULTIMATE», «AQUASPICE», «DWC»

Horizon 2020
European Union funding
for Research & Innovation

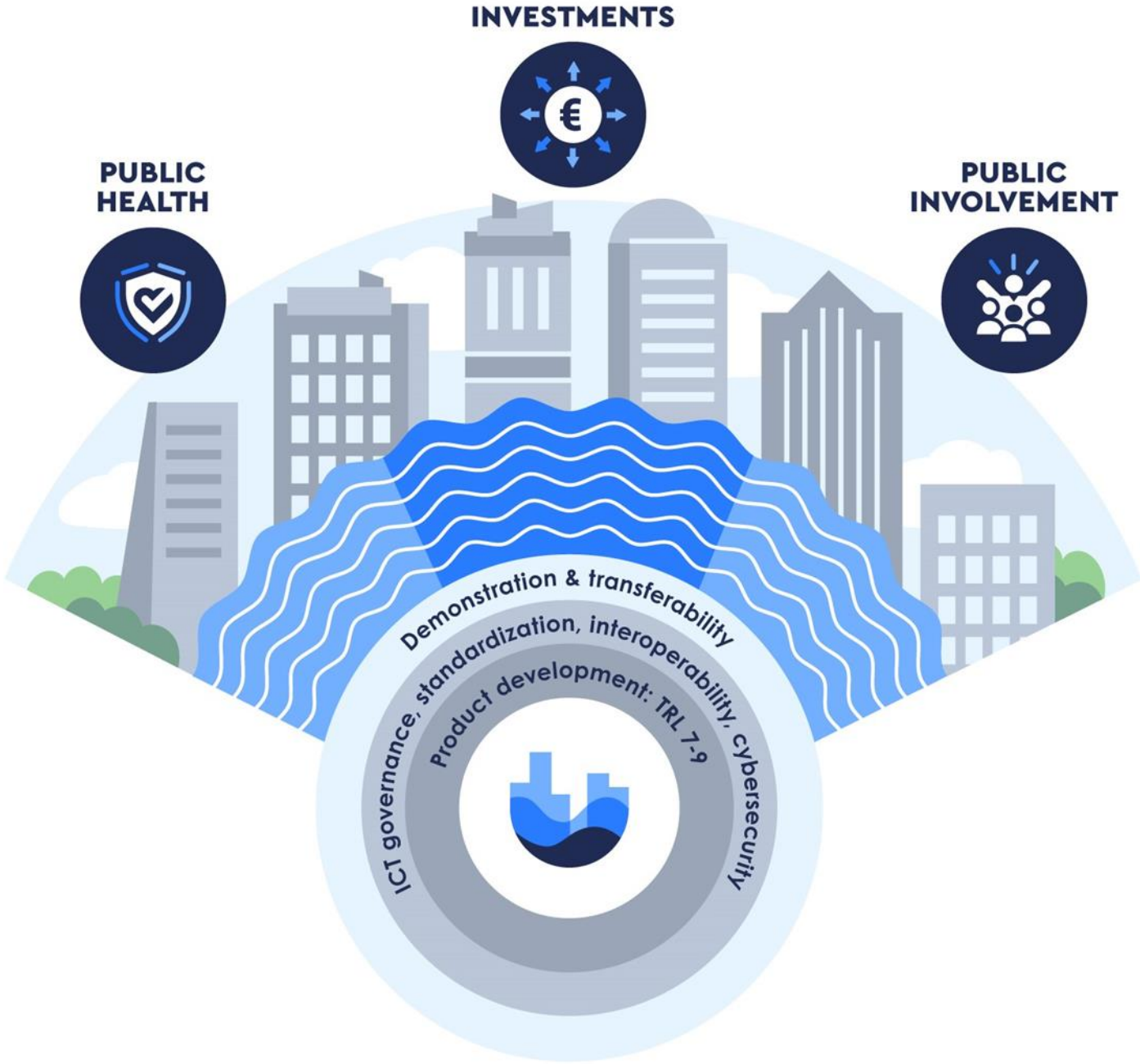
Contents

Overview of innovative solutions under validation within H2020 projects:

- **Digital solutions** (H2020 DWC)
- **Resource Recovery and Water-Smart Industrial Symbiosis** (H2020 SMART-PLANT, ULTIMATE and AQUASPICE)
- **Nature-based solutions** (H2020 HYDROUSA)

Objective

Develop and demonstrate **15 advanced digital solutions** to address water-related challenges



24 partners

KOMPETENZZENTRUM Wasser Berlin

Utilities

Berliner Wasserbetriebe

Sofiyska Voda

SIAAP
Service public de l'assainissement francilien

GRUPPO CAP

BIOFOS

R&D

UNIVERSITÀ POLITECNICA DELLE MARCHE

UNIVERSITÀ DEGLI STUDI DI MILANO

SINTEF

SORBONNE UNIVERSITÉ

eco logic

irstea

DHI

ISTITVTO SVPERIORE DI SANITÀ

Companies and SME

ICRA
Institut Català de Recerca de l'Aigua

PARTNERS4URBANWATER
Langeveld | Liefting | Schilperoort | De Haan | Post

IPEK

ICATALIST

fluidion
fluidic intelligence

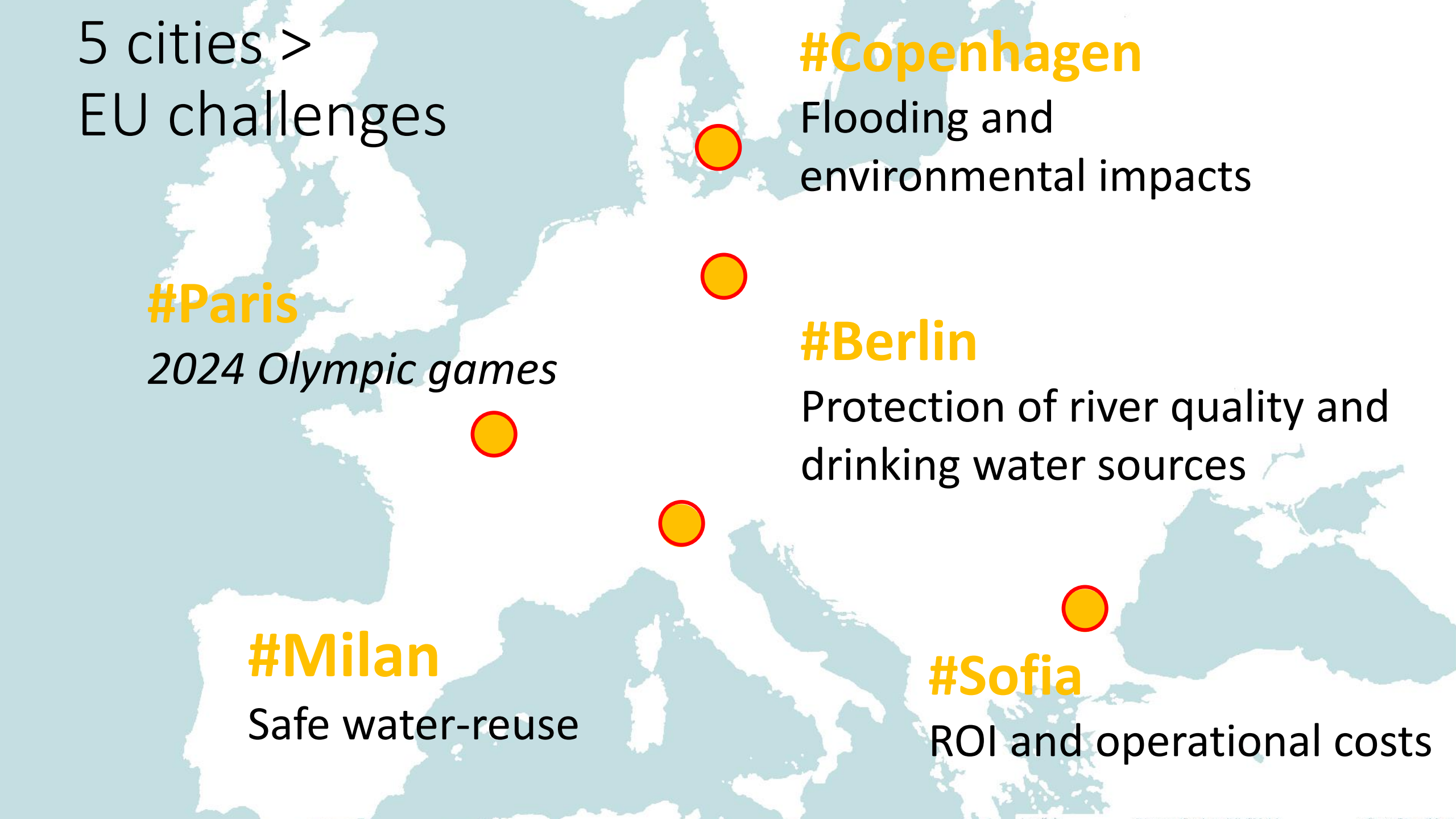
GIMENO grupo

kondo

Vragments

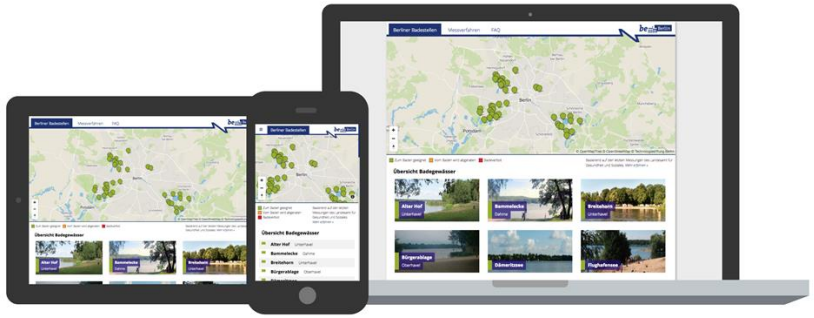
Strane Innovation

Arctik
Communication for sustainability


5 cities >
EU challenges
#Copenhagen
Flooding and environmental impacts
#Paris
2024 Olympic games
#Berlin
Protection of river quality and drinking water sources
#Milan
Safe water-reuse
#Sofia
ROI and operational costs

Bathing water

Early warning system to forecast bathing water quality and communicate with the public

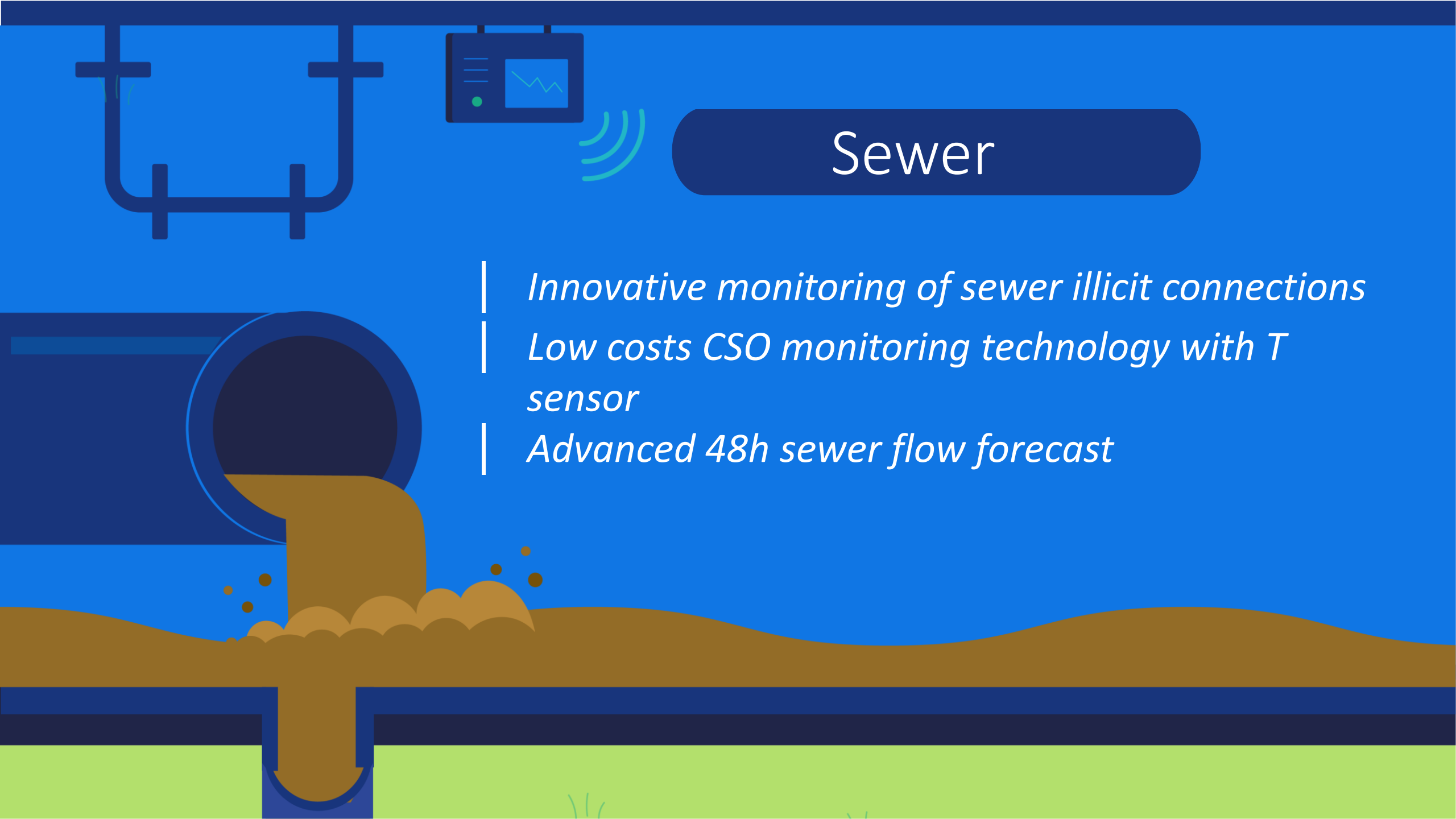


Mockup: Technologiestiftung Berlin

Real-time measurement of bacterial contamination

Drinking water

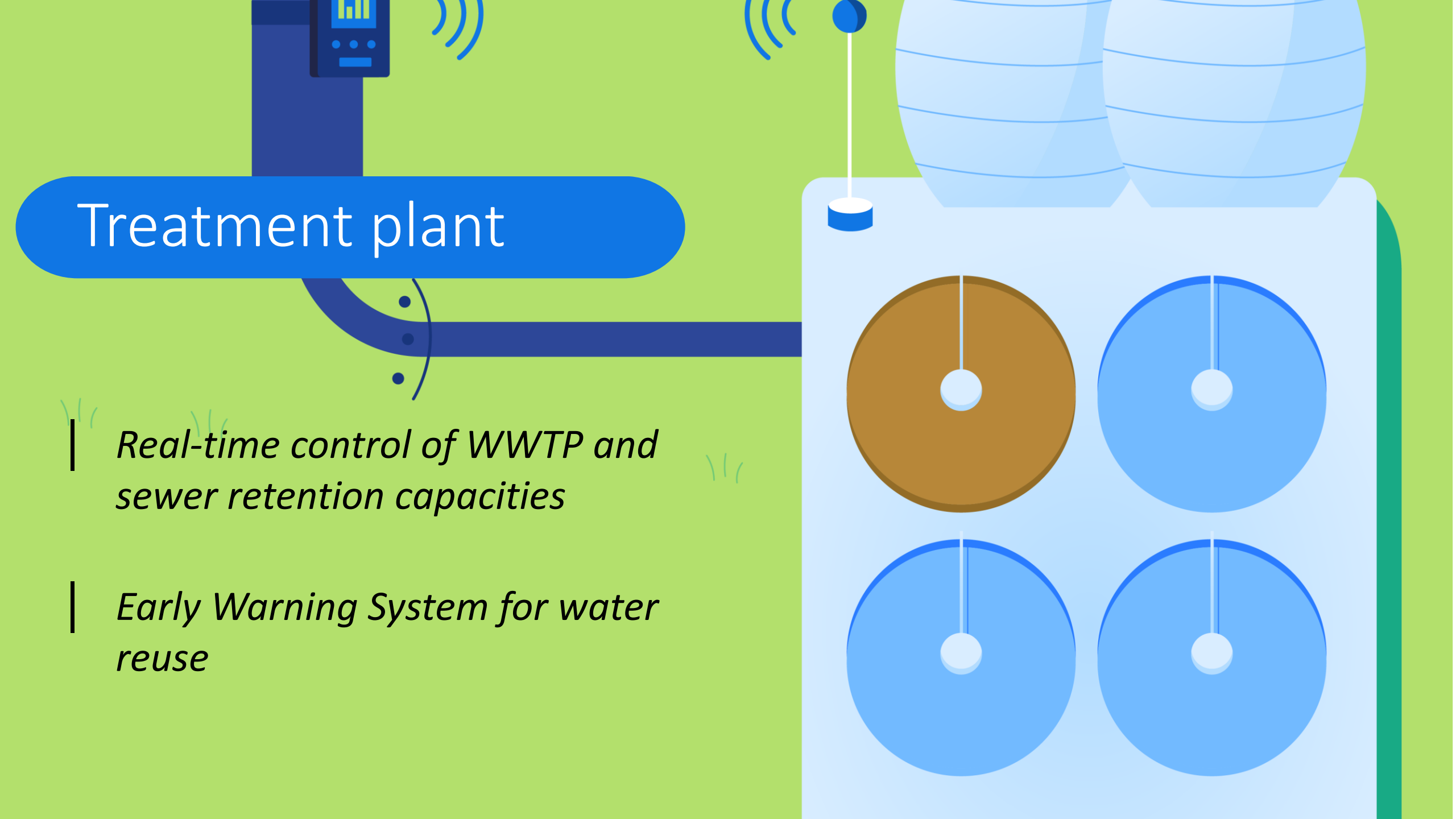
Predictive asset management of drinking water wells



Sewer

- *Innovative monitoring of sewer illicit connections*
- *Low costs CSO monitoring technology with T sensor*
- *Advanced 48h sewer flow forecast*

Treatment plant



- *Real-time control of WWTP and sewer retention capacities*
- *Early Warning System for water reuse*

Water reuse

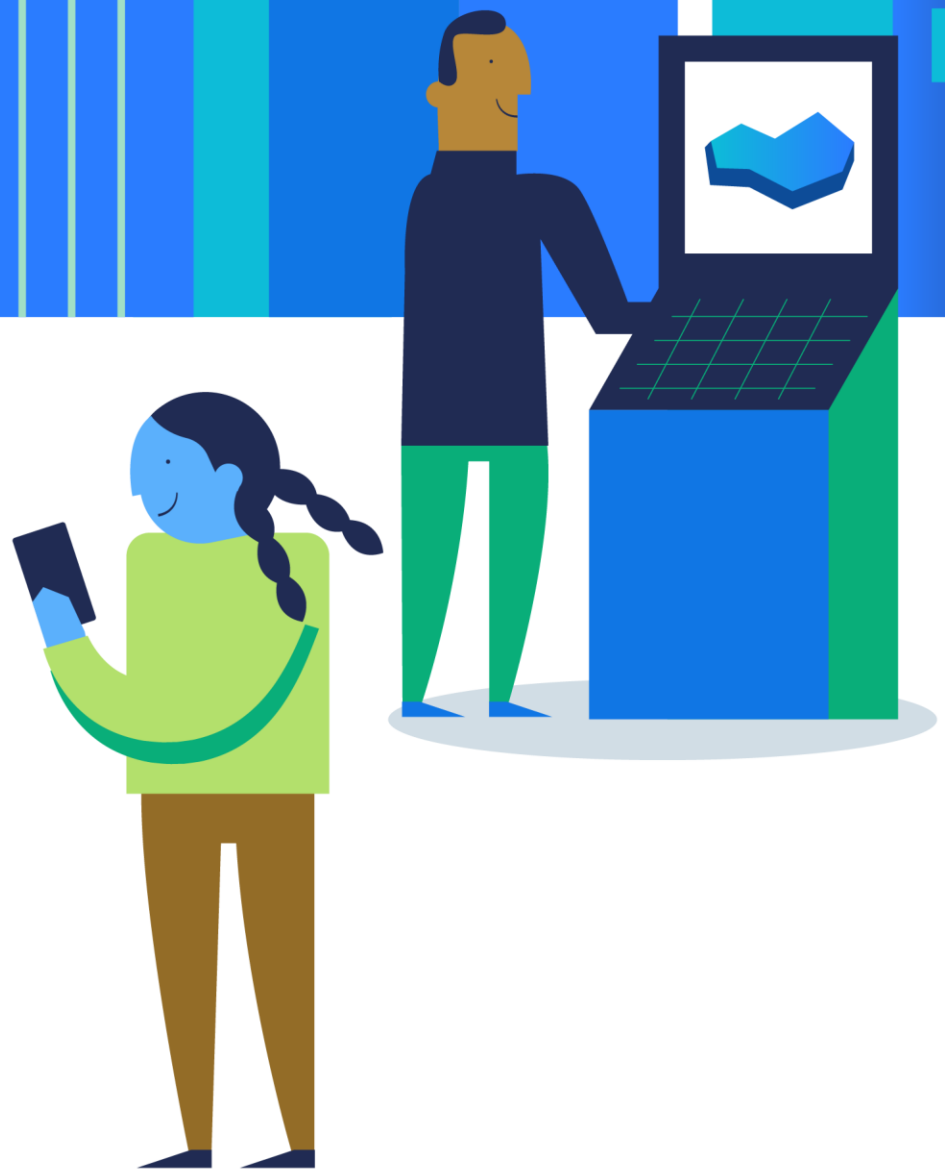
Remote monitoring of water stress

Match making platform to support water allocation

Public involvement

- *Augmented Reality (AR) app to communicate groundwater issue with the public*

- *Serious game to communicate the benefits of reuse in term of nexus*



Interoperability + Cybersecurity

The success of a digital solution does not depend only on the product itself but also on its **safe integration** into the utilities systems

Stress-testing platform

Cyber risk

Ontology and FIWARE

DWC in few words

→ Leverage the **potential of data and digital** technologies

→ **Boost the water management** in 5 EU cities

→ **Promote the value** of the digital solutions for the tech providers

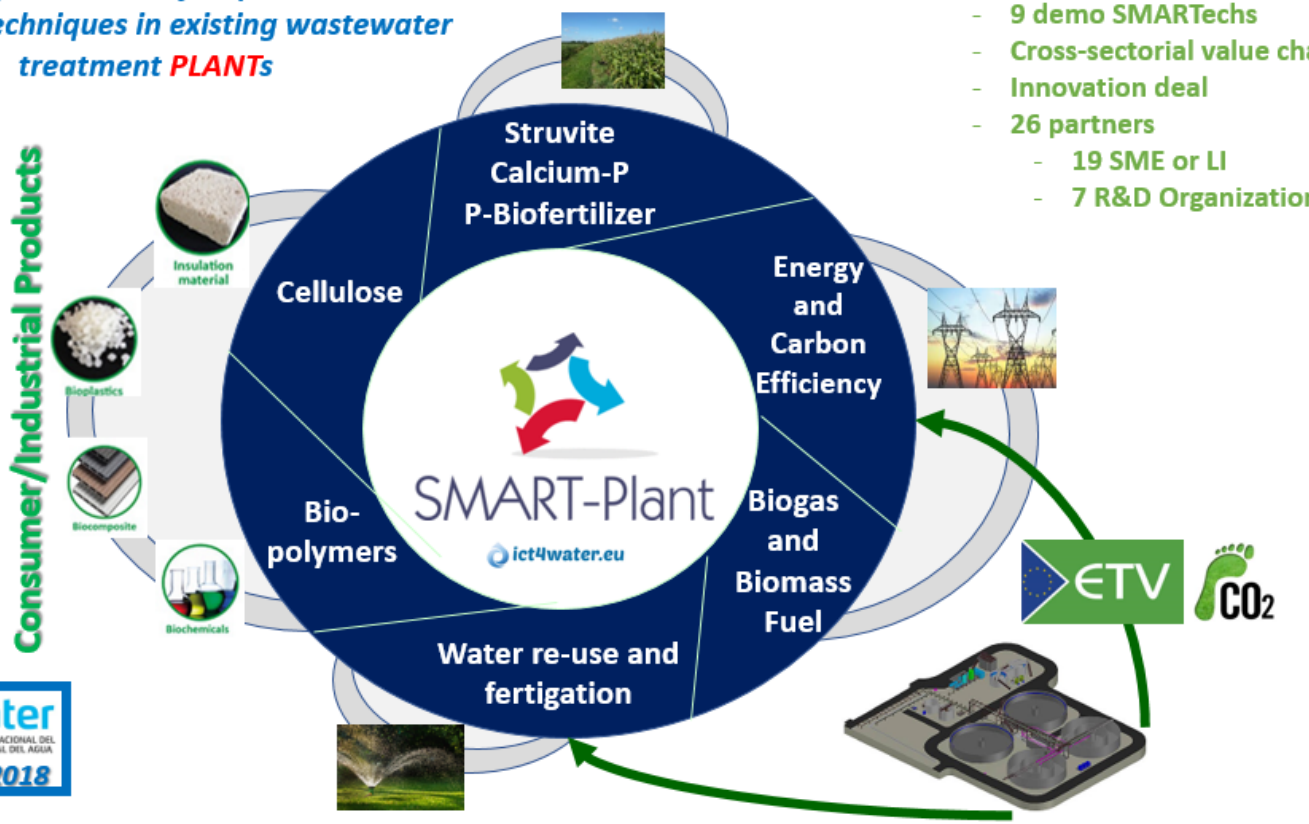
→ Achieve a **new step in the integration** of digital solutions in EU, in particular regarding cybersecurity, interoperability and governance

Sustainable Resource Recovery and Safe Reuse – SMART-Plant

www.smart-plant.eu

Scale-up of low-carbon footprint MAterial Recovery Techniques in existing wastewater treatment PLANTs

- Horizon2020 IA
- 9 demo SMARTechs
- Cross-sectorial value chain
- Innovation deal
- 26 partners
  - 19 SME or LI
  - 7 R&D Organization



iwater SALÓN INTERNACIONAL DEL CICLO INTEGRAL DEL AGUA AWARD 2018

***Unique Selling Point** of the SMARTechs: high water quality, energy-efficiency, carbon footprint, sludge reduction and…materials recovery and reuse via SMART-Products*

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WWE LAB Water and Waste Environmental Engineering · UNIVERSITÀ POLITECNICA DELLE MARCHE

Sustainable Resource Recovery and Safe Reuse – SMART-Plant
www.smart-plant.eu

SMARTechs integrated in existing WWTPs (revamped/upgraded to WRRFs)


SMARTech1 - Geestmerambacht WWTP (NL)


SMARTech2a – Karmiel WWTP (IL)


SMARTech2b and Downstream SMARTech B - Manresa WWTP (Spain)


SMARTech3 – WWTP at Cranfield University (UK)


SMARTech 4a and SMARTech 5 Carbonera WWTP (Italy)


SMARTech 4b - Psyttalia WWTP (Greece)

Sustainable Resource Recovery and Safe Reuse – SMART-Plant
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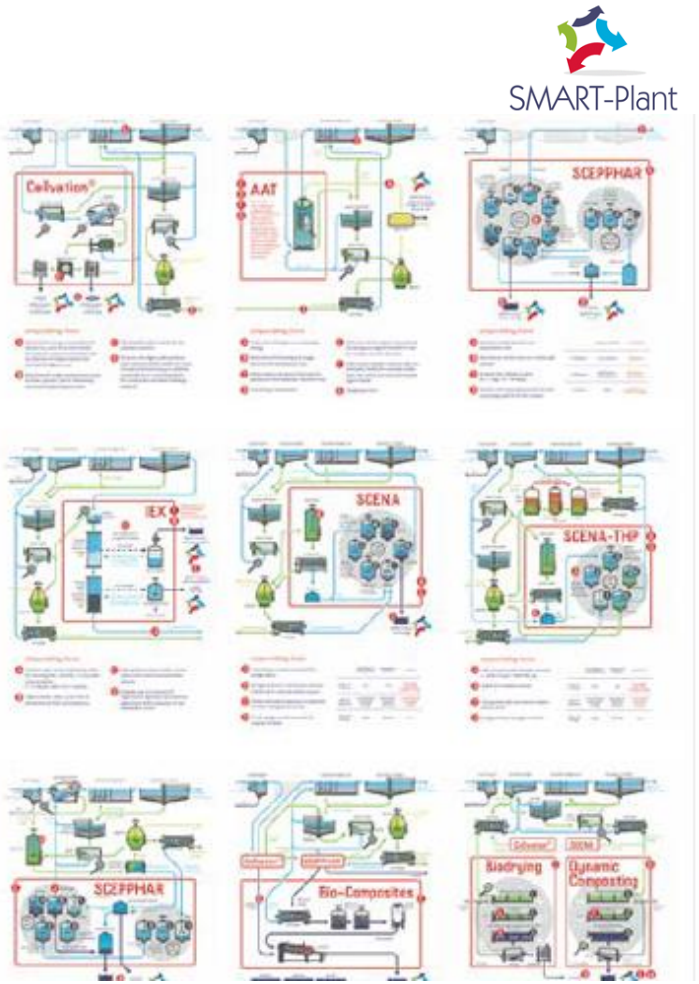
Achievements of SMART-Plant

	SMARTech n.	Integrated municipal WWTP	Key enabling process(es)	SMART-product(s)
Mainstream	1	Geestmerambacht (Netherlands)	**Upstream dynamic fine-screen** and post-processing of cellulosic sludge	**Cellulosic sludge, refined clean cellulose**
Mainstream	2a ETV	Karmiel (Israel)	Mainstream polyurethane-based **anaerobic biofilter**	**Biogas, Energy-efficient water reuse**
Mainstream	2b	Manresa (Spain)	Mainstream **SCEPPHAR**	**Struvite, PHA**
Mainstream	3	Cranfield (UK)	Mainstream **tertiary hybrid ion exchange**	**Nutrients**
Sidestream	4a ETV	Carbonera (Italy)	**Sidestream SCENA**	**P-rich sludge, VFA**
Sidestream	4b	Psyttalia (Greece)	**Sidestream Thermal hydrolysis – SCENA**	**P-rich sludge**
Sidestream	5	Carbonera (Italy)	**Sidestream SCEPPHAR**	**PHA, struvite, VFA**



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Long-term *SMART*ech Evidence Based results

- Cellulose 2,0-7,3 kg per PE per Year
- PHA 1-1,2 kg per PE per Year
- CaP 0,4-0,8 kgP PE per Year
- Struvite 0,2-0,4 kg PE per Year
- Ammonia and ammonium sulphate 20-30 kgN PE per Year
- Spent zeolite resin (rich in K and NH3)
- Biofertilizer
- ***Energy saving 4-68 %***
- ***GHG emission reduction 1-71 %***
- ***Sludge reduction 18-30 %***

SMART-Plant

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Water-Smart Industrial Symbiosis – ULTIMATE

www.ultimatewater.eu

indUstry water-utiLiTy symblosis for a sMarter wATEr society

ULTIMATE
WATER SMART INDUSTRIAL SYMBIOSIS

1. Showcase, promote and learn from ***successful high profile WSIS Cases***.
2. Develop, optimise and demonstrate multi-layered water-related (water-energy-materials) resources ***reuse technologies and solutions*** within key industrial sectors
3. Assemble, further develop and apply ***digital support tools*** to identify symbiotic opportunities, improve the design, control and operation of industrial symbiotic schemes, as well as their medium- and long-term assessment
4. Develop and demonstrate novel exploitation/valorisation schemes (value chains) for these resources, through a range of ***business models*** and symbiotic arrangements and link them to ongoing investments and plans of industries and water utilities.

Demonstrating win-win symbiotic opportunities

- **Enabling Technologies** — Demonstrating novel (TRL 5-7) technologies at meaningful scales achieving quantifiable impacts (economic, environmental, social)
- **Symbiotic Paradigms** — Showcasing 9 WSIS 'modes' between water providers (municipal or industry owned utilities, service-providing SMEs) and key industries
- **Smart Tools** — Leveraging the power of Ontologies, Hybrid Modelling and Simulation, Gamified Visualisation and immersive Mixed Reality Storytelling
- **Water-Energy-Materials** — Demonstrating circular solutions for water as both resource and vector of energy and materials with millions invested and decades of experience
- **Innovator Ecosystem** — Open Innovation and co-creation with industry and the public meets start-ups and established players in B2B, B2G, B2C CoPs and Living Labs
- **WSIS Market Building** — WSIS matchmaking supported by start-ups, ontologies and financial engineering linking investments to KPIs for business innovation
- **Global Outreach** — Engaging EU and global networks of industries, water companies, SMEs, business innovators and media to disseminate, influence, broker, transfer
- **Strong Partnership** — A team of 8 technology & service providers (of which 6 SMEs), 8 utilities (incl. 2 multinationals), 4 industries, 9 Research Centres and Water Europe

for water-smart industrial symbiosis (WSIS)

- Cases **where water demand, energy consumption, wastewater generation of an industry** are significantly reduced through innovations (delivered by water service providers) in extraction/production/reuse of **water/energy/heat** from *treated industrial wastewater.*
- Cases where **treated municipal wastewater** is reclaimed by water utilities and used as an input by neighbouring industries releasing precious water resources and **climate-proofing** nearby communities
- Cases where **materials** (e.g. **nutrients or high- added-value compounds**) extracted from industrial wastewater (by specialised water service providers) are used as resources by either the industry itself, by "downstream" (symbiotic) industries or are directly marketed to third parties outside the local cluster.

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ULTIMATE

26 partners

KWR

Utilities

MEKOROT

ARETUSA Water Recycling

aitasa Aguas Industriales de Tarragona S. A.

Non-profit organizations

Water Europe Technology & Innovation

R&D

eurecat

UNIVERSITÀ POLITECNICA DELLE MARCHE

National Technical University of Athens

Cranfield University

The Galilee Society

UNIVERSITY OF EXETER

NTNU | Norwegian University of Science and Technology

KOMPETENZZENTRUM WasserBerlin

Companies and SMEs

AgRobics

aqualia

Greener than Green TECHNOLOGIES

suez

ESCI European Science Communication Institute

Aquabio

PENTAIR X-FLOW

Strane Innovation

CONSORZIO POLO TECNOLOGICO MAGONA

WEST Systems

KALUNDBORG SYMBIOSIS

novozymes

ALBERTA

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Real-time data driven monitoring and process control for salinity management

- **Real-time data** for measuring the intrusion and infiltration of sea water into the sewer network in order to avoid salinity peaks in Aretusa
- **ICT Tools**: integrate the real-time flow data from the two WWTPs (Cecina and Rosignano) and from the upstream sewage system, as well as the online conductivity data in the WWTP effluents and in the strategic points of the sewage systems
- **Early warning system** for seawater intrusion and salinity management, using models with hydrometeorological forecasts (wind speed and direction, precipitation) combined with hydrogeological data (groundwater level). The goal is to predict intrusions and impacts of salt water (sea spray)

Data-driven matchmaking platform for water reuse

Implementation of a data-based matchmaking platform for water reuse to manage industrial and agricultural demand for water supply from various sources (water reuse, wells, surface water).

 Water quality approach based on the online measurement of parameters (salinity, turbidity, COD)

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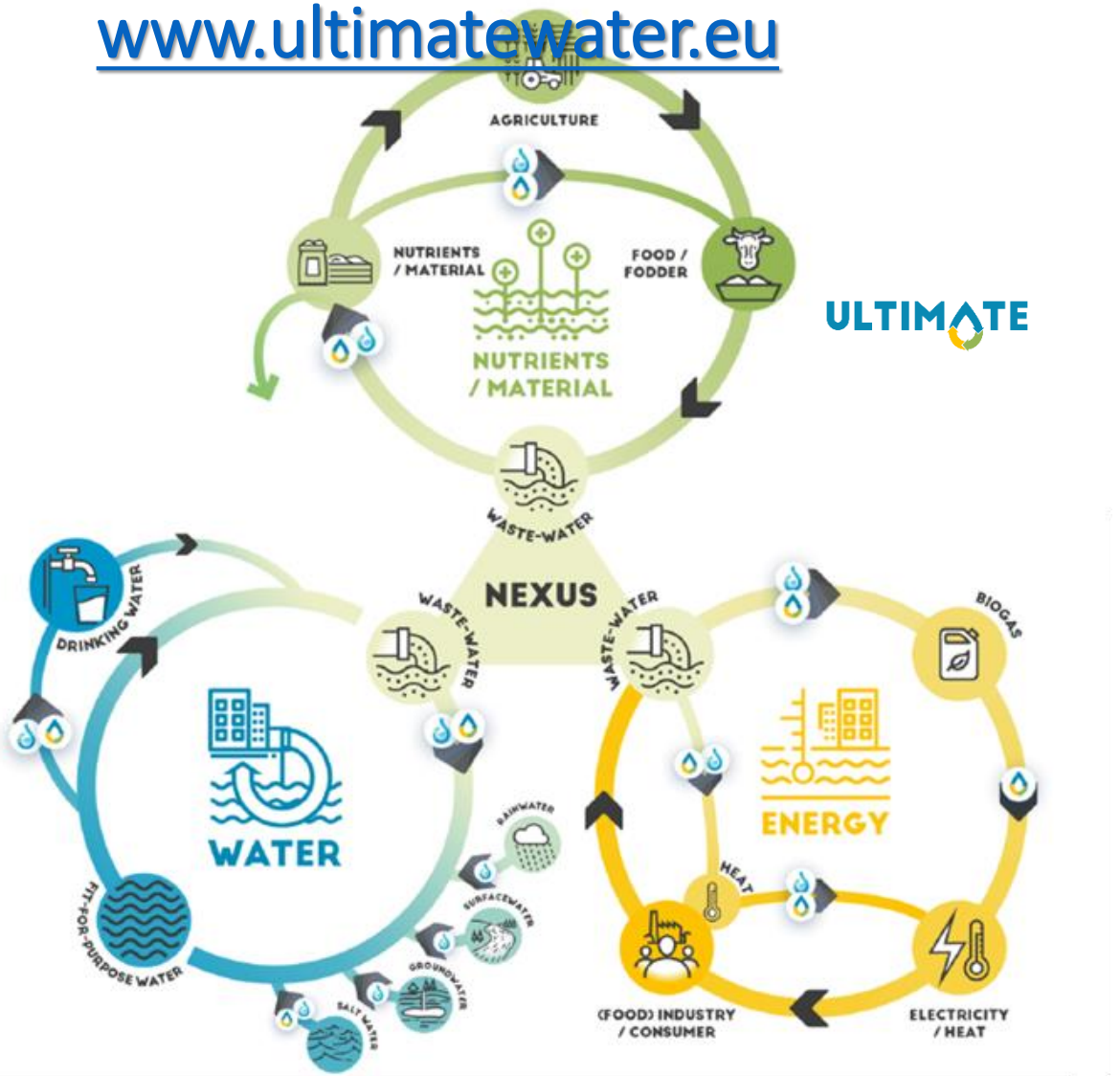

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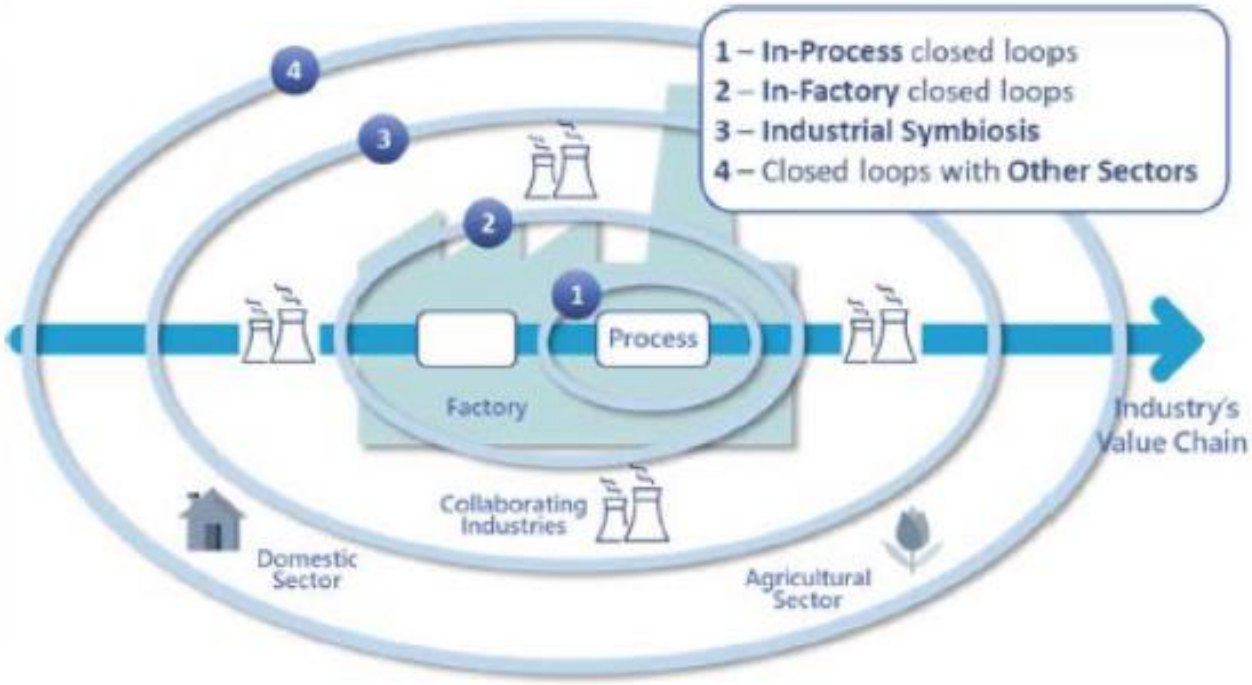

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AquaSPICE

29 partners

RWTH AACHEN UNIVERSITY

Utilities

water-link

AZIENDA SERVIZI AMBIENTALI SpA

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UNIVERSITY OF APPLIED SCIENCES

KWR

Πολυτεχνείο Κρήτης

eurecat Centre Tecnològic de Catalunya

GNEIG

E-BUSINESS RESEARCH CENTER ELTRUN

vito

Companies and SMEs

DOW

BASF

SOLVAY

CCELIGENCE

Tüpraş

Evides waterbedrijf

GRUPPO Maggioli

gems

AGRICOLA neam de gospodari

Strane Innovation

BDG Business Development Group

QLECTOR

Non-profit organizations

Water Europe Technology & Innovation

Audencia

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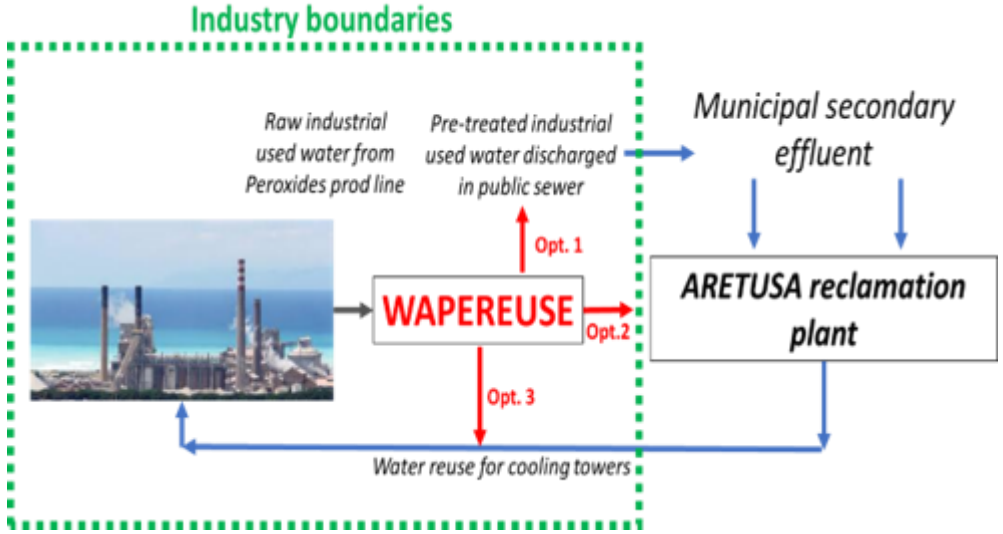
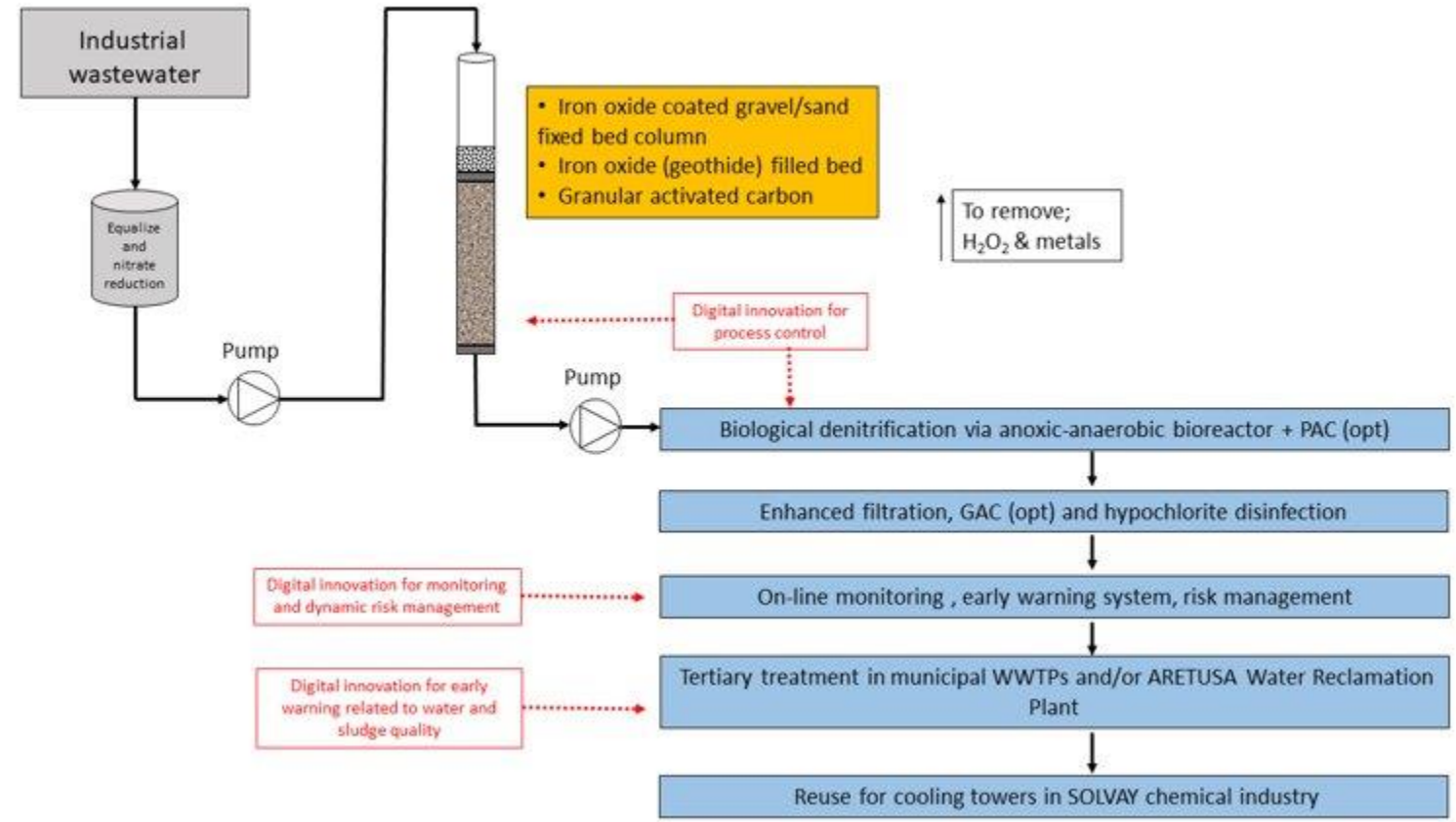
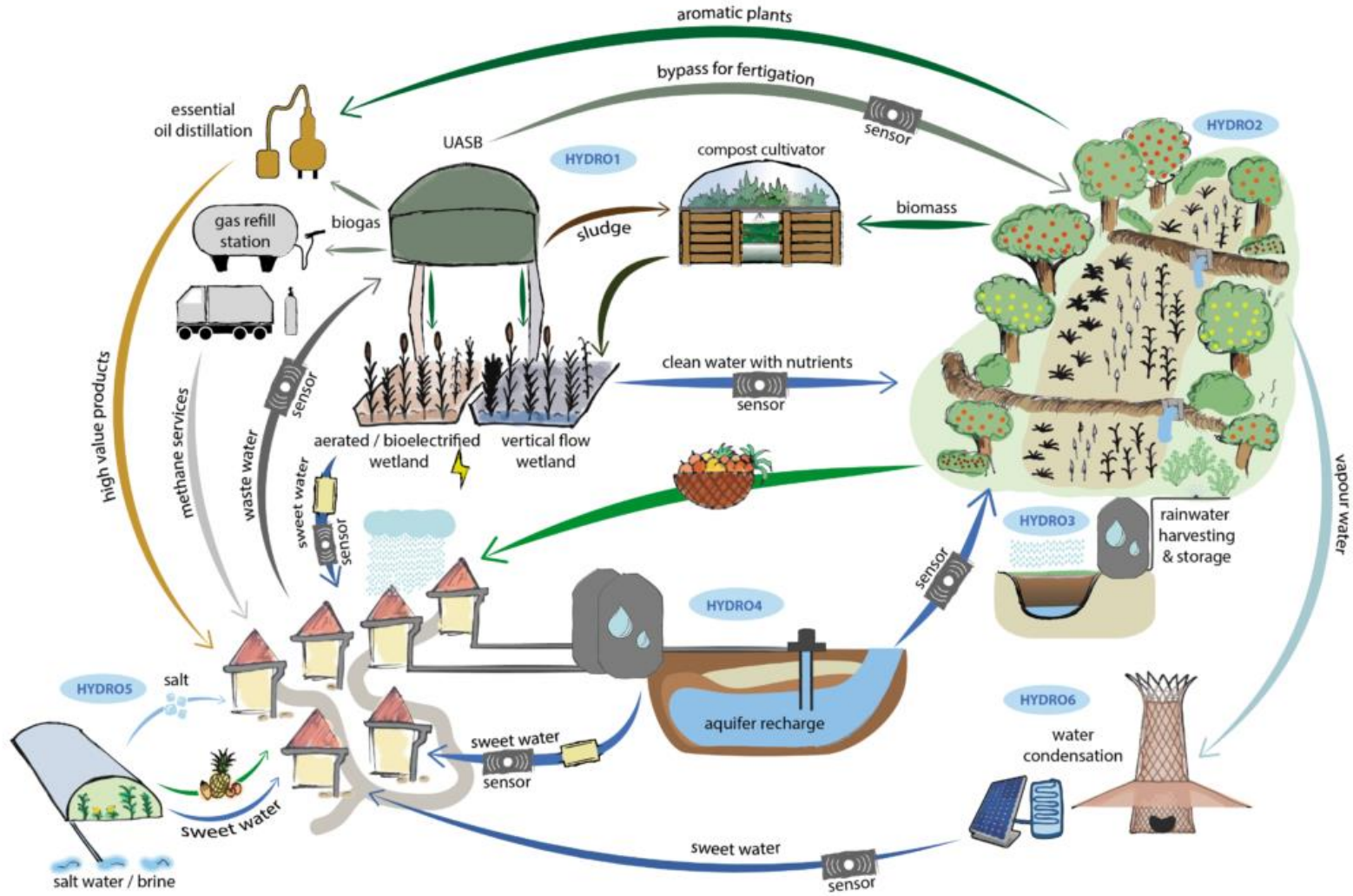




Nature-based solutions – HYDROUSA www.hydrousa.org



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WWE LAB Water and Waste Environmental Engineering · UNIVERSITÀ POLITECNICA DELLE MARCHE

Nature-based solutions – HYDROUSA www.hydrousa.org

26 partners

National Technical University of Athens

Municipalities/NGO

MUNICIPALITY OF MYKONOS

Δήμος Τήνου

Lesvos

CWP

SEMIDE EMWIS

IMPACT HUB Athens

WssTP

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Brunel University London

Heliopolis University for Sustainable Development

ICRA

Companies and SMEs

Radtke Biotechnik

TINOS ECO LODGE

alchemia nova

AGENSO

Planet

iSiS

IRIDRA

Ntellaros Water Resources Management

BIOVERSUM

plenum

MINAVRA TECHNIKI AE CONSTRUCTIONS

aeris

SATISTICA

MEMIRA GENESIS

Water and Waste Enviromental Engineering LAB

Sustainable Water Solutions:
Efficiency in Waste Water Treatment Technologies

online, 16.06.2021

Thank you!

Prof. Eng. Francesco Fatone, PhD, IWA Fellow
f.fatone@staff.univpm.it

Horizon 2020
European Union funding
for Research & Innovation